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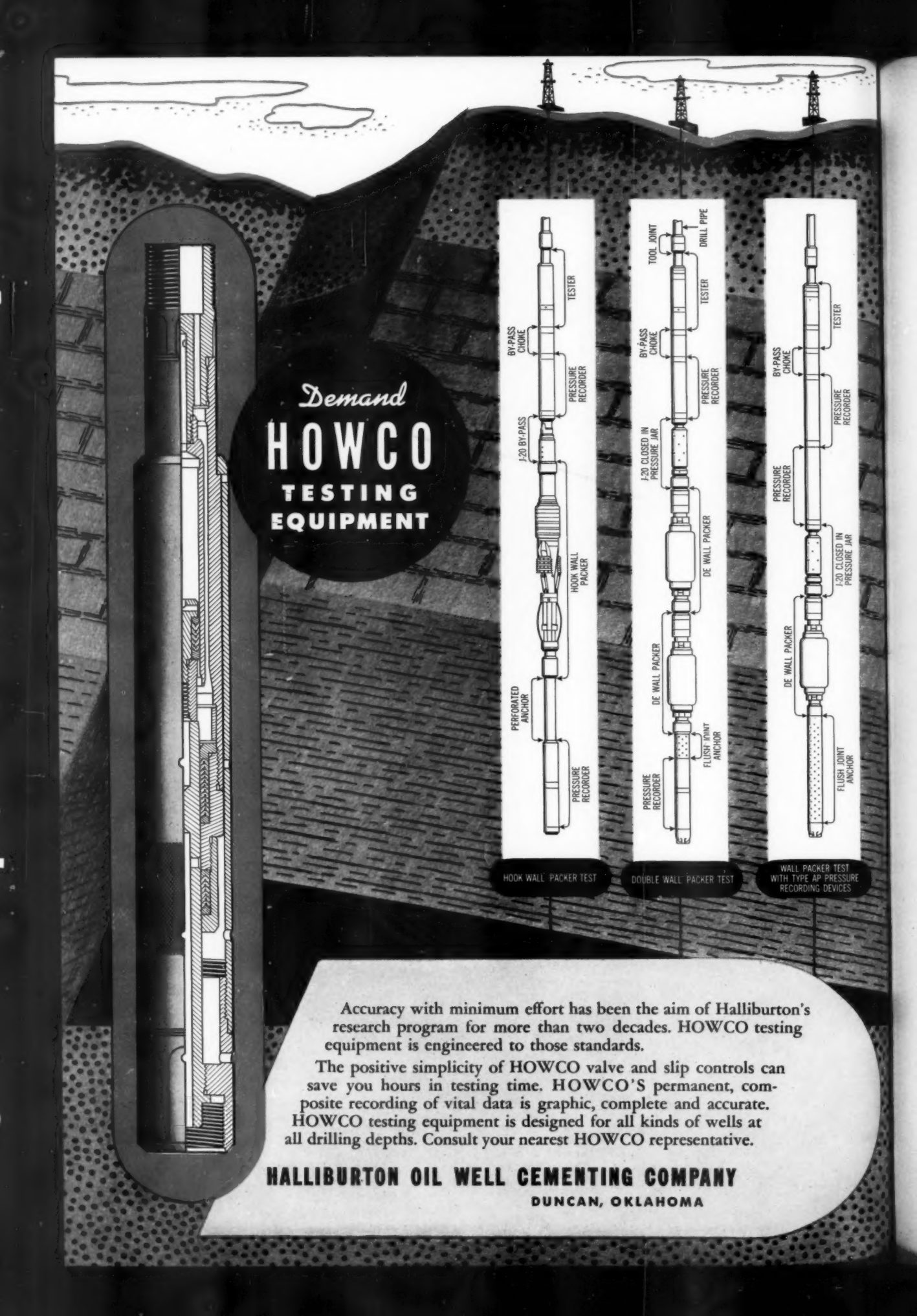
PRICE 50 CENTS TABLE OF CONTENTS PAGE 17 JANUARY 4, 1951



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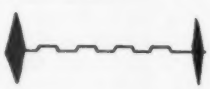

Pulse pattern, showing the initial pattern at the extreme left and the reflection from the opposite side at the extreme right. The sweep line indicates no defects.

A typical indication of a defect is illustrated here. By means of calibration, it is now possible to determine both the exact position of the flaw, as well as its size.

Today, Supersonic testing is available on specification for inspecting Grinnell prefabricated piping. By observing the pattern produced by the electron beam on the fluorescent screen, any defects in the base metal, welds, or variations in pipe thickness can be located and measured at a glance.

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"Abqaiq is producing 450,000 bbl. of oil per day as against East Texas' 300,000 bbl. per day. Abqaiq is producing this oil from 45 wells at a rate of 10,000 bbl. per well per day. There are 62 wells in the field; 17 wells are held in reserve. East Texas has 23,000 wells and produces 300,000 bbl. per day.

"The oil fields around the Persian Gulf have reserves of 26 billion barrels of oil. This compares with 24 billion barrels oil reserve in the United States.

"All of this Middle East oil lies under the shadow of the Russian Bear. It is within a few hours' airplane flight. Iran joins the Russian border. These fields are wholly without armed defenses.

"I have heard a high military authority testify before a committee of the Congress that we could not defend these oil fields. After our pitiful early experience in Korea, it would seem clear to even the uninitiated that certainly we could not successfully defend oil fields situated 10,000 miles around the globe from our Atlantic shores.

"If we cannot defend them, then we must grant that Russia can at will seize and hold the Middle East oil.

"Surely we might destroy part of wells and refineries. But new wells could be promptly sunk and the refineries repaired and put back into operation. Therefore, oil is within reach of Russia. It is in her grasp and she may only be waiting until we get all the wells dug and complete installations fitted out, then step in and take over. It is possible."

Lt. Gen. Ernest O. Thompson, Texas Railroad commissioner, speaking before the Texas Independent Producers and Royalty Owners Association, San Antonio.

We'll Expand, Not Contract

"I can assure you that the government agencies responsible for administering the defense program are leaving nothing undone to increase the production and supply of critical and strategic materials. For some, the outlook for increased supply in the next year or so is quite favorable. For example, in the steel and aluminum industries, substantial expansion is taking place. Unfortunately, for some equally important metals, we cannot expect larger supplies for 2 or 3 years. Copper is a good example. In the case of a few metals, such as nickel, cobalt, and columbium, apparently the supply cannot be increased to an appreciable degree.

"The current status of the defense program may be summarized this way: Military requirements for materials and facilities are being supplied as needed, and there is no delay so far as I am aware; the balance of materials for nondefense use is being equitably distributed to all users (by industry and by individual firms); our production facilities are being expanded, wherever this is possible, to meet our increased defense needs; we intend to conserve strategic and critical materials by limiting their use and in other ways; with all of this we intend to preserve our economic strength—expand and not contract.

H. B. McCoy, assistant administrator, National Production Authority, before Conference of Production and Marketing Administration, Department of Agriculture, Chicago.

Likes Drilling Feature

Sir:

Commercial Chemicals, Ltd., in being basic suppliers for many of the drilling needs in western Canada, are closely connected to the drilling program in western Canada.

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fine pamphlet I saw the other day, entitled "Deep Rotary Drilling," a reprint from the Drilling Contractors and Equipment annual number from The Oil and Gas Journal of October 5, 1950, pages 141-189.

Would you kindly inform the writer how a copy may be obtained for this office. Such pamphlets are excellent aids and very much appreciated by all who have seen them.

Jas. D. Kay,
Branch Manager,
Commercial Chemicals, Ltd.,
Vancouver, B. C., Canada.

CALENDAR

1951

January

American Gas Association, home-service workshop, Hotel Statler, Washington, D. C., January 3-5.

Kansas Oil Men's Association, annual convention, Lassen Hotel, Wichita, January 8-9.

Society of Automotive Engineers, annual meeting and engineering display, Hotel Book-Cadillac, Detroit, January 8-12.

Pipeline Contractors Association, annual convention, Shamrock Hotel, Houston, January 9-10.

American Institute of Electrical Engineers, Tulsa Section, meeting on explosion-proof motors, Michaelis Cafeteria, January 11.

Kansas-Oklahoma Water Flood Operators, monthly meeting, Booth Hotel, Independence, Kans., January 17.

Southwestern Legal Foundation, second annual institute on oil and gas law and taxation, Southwestern Legal Center, Dallas, January 18-20.

L.P.G. Engine Fuel School, Kansas State College, Manhattan, Kans., January 21-23.

Compressed Gas Association, annual meeting, Waldorf-Astoria Hotel, New York City, January 22-23.

Northwest Petroleum Association, annual convention, Nicollet Hotel, Minneapolis, January 25-26.

Southern Gas Association, employe-relations section and accident-prevention round tables, Mobile, Ala., January 26.

Instrument Society of America, New York section, Hotel New Yorker, New York City, January 26-27.

February

American Institute of Electrical Engineers, Tulsa Section, meeting on explosion-proof electrical equipment, Michaelis Cafeteria, February 8.

American Institute of Mining and Metallurgical Engineers, annual meeting, Jefferson and Statler hotels, St. Louis, February 19-22.

Kentucky Petroleum Marketers Association, annual meeting and trade show, Brown Hotel, Louisville, February 20-21.

Kansas-Oklahoma Water Flood Operators, monthly meeting, Booth Hotel, Independence, Kans., February 21.

National Association of Corrosion Engineers, Tulsa Section, Short Course on Practical Control of Pipe-Line Corrosion, Mayo Hotel, February 21-23.

Iowa Independent Oil Jobbers' Association, Inc., annual convention, Hotel Fort Des Moines, Des Moines, February 21-22.

Wisconsin Petroleum Association, annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 27-28

March

American Association of Petroleum Geologists, Rocky Mountain Section, Shirley Savoy Hotel, Denver, March 1-2.

American Society for Testing Materials, spring meeting and committee week, Cincinnati, March 5-9.

American Petroleum Institute, division of production, southwestern district meeting, Hotel Beaumont, Beaumont, Tex., March 7-9.

Indiana Independent Petroleum Association, spring convention and refiners and suppliers exhibit, Hotel Severin, Indianapolis, March 8-9.

Mid-West Gas Association, Hotel Fontenelle, Omaha, March 12-14.

Illinois Petroleum Marketers Association, annual convention, Sherman Hotel, Chicago, March 13-15.

National Association of Corrosion Engineers, annual conference and exhibition, Statler Hotel, New York City, March 13-16.

Gas Appliance Manufacturers Association, annual meeting, The Homestead, Hot Springs, Va., March 19-21.

Ohio Petroleum Marketers Association, annual convention and marketing exposition, Deshler-Wallick Hotel, Columbus, Ohio, March 20-22.

American Petroleum Institute, division of production, Mid-Continent district spring meeting, Herring Hotel, Amarillo, March 21-23.

Texas Independent Producers and Royalty Owners Association, fifth annual meeting, Beaumont, Tex., March 27-28.

New England Gas Association, annual meeting, Hotel Statler, Boston, March 29-30

April

American Gas Association, industrial and commercial gas section, conference on industrial and commercial gas, Shoreham Hotel, Washington, D. C., April 2-4.

American Society of Mechanical Engineers, spring meeting, Atlanta, April 2-5

Instrument Society of America, New Jersey section, Essex House, Newark, N. J., April 3.

American Petroleum Institute, division of production, Eastern district meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 3-5.

Mid-West Regional Gas Sales Conference, Edgewater Beach Hotel, Chicago, April 9-11.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 10-12.

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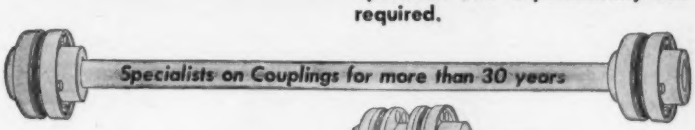

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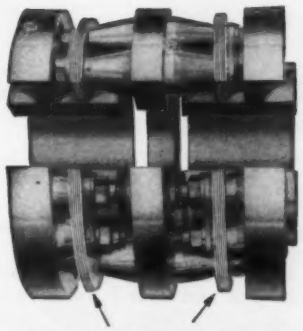

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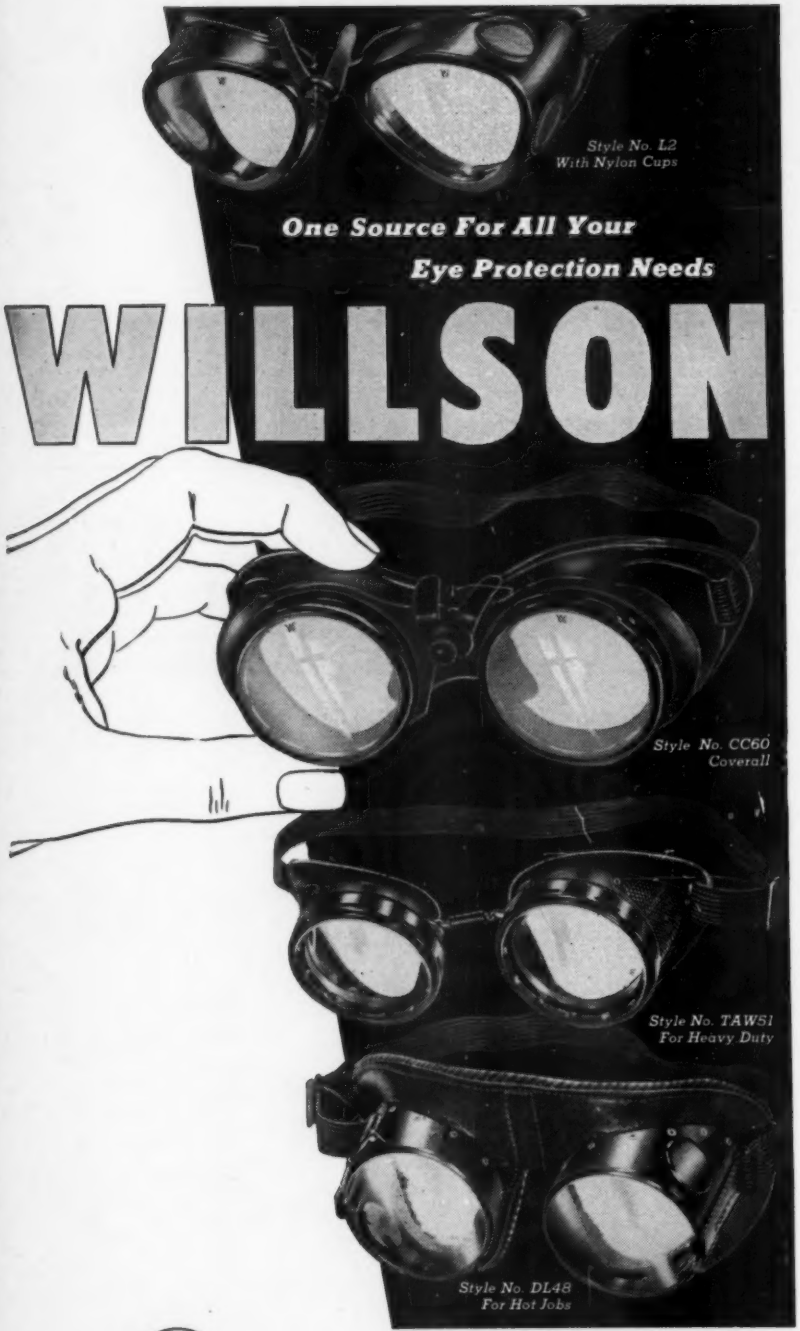

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American Gas Association, distribution, motor vehicle, and corrosion conference, Hotel Peabody, Memphis, April 16-18.

American Society of Lubrication Engineers, annual convention and lubrication show, Bellevue-Stratford Hotel, Philadelphia, April 16-18.

National Petroleum Association, Hotel Cleveland, Cleveland, April 18-20.

American Petroleum Institute, Rocky Mountain district spring meeting, Gladstone Hotel, Casper, Wyo., April 19-20.

Southern Gas Association, Buena Vista and Edgewater Gulf hotels, Biloxi, Miss., April 23-25.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, Society of Exploration Geophysicists, joint annual meeting, Jefferson Hotel, St. Louis, April 23-26.

Natural Gasoline Association of America, annual convention, Mayo Hotel, Tulsa, April 25-27.

Indiana Gas Association, French Lick Springs Hotel, French Lick, Ind., April 26-27.

American Gas Association, industrial and commercial gas section, industrial gas school, William Penn Hotel, Pittsburgh, April 29-May 4.

American Geophysical Union, thirty-second annual meeting, National Academy of Sciences, Washington, D. C., April 30-May 2.

American Petroleum Institute, division of refining, sixteenth mid-year meeting, Mayo Hotel, Tulsa, April 30-May 3.

May

American Gas Association, Natural-Gas Department, Dallas, May 7-8.

Independent Petroleum Association of America, mid-year directors' meeting, Cosmopolitan Hotel, Denver, May 7-8.

Gas Appliance Manufacturers Association, natural-gas department spring meeting, Dallas, May 7-9.

Liquefied Petroleum Gas Association, annual convention and trade show, Stevens Hotel, Chicago, May 7-10.

American Petroleum Institute, division of production, Pacific Coast district, spring meeting, Biltmore Hotel, Los Angeles, May 10-11.

American Institute of Chemical Engineers, regional meeting, Hotel Muehlebach, Kansas City, May 13-16.

American Gas Association, operating section, production and chemical conference, Hotel New Yorker, New York City, May 14-16.

Pennsylvania Gas Association, Wernersville, Pa., May 15-17.

American Petroleum Institute, division of marketing, mid-year meeting, Cincinnati, May 28-29.

Third World Petroleum Congress, Kurhaus, Scheveningen, the Netherlands, May 28-June 6.

American Petroleum Institute, standardization and standing committees, division of production, mid-year meeting, Brown Palace Hotel, Denver, May 28-June 1.

June

American Society of Mechanical Engineers, semiannual meeting, Toronto, Ont., Canada, June 11-15.

Canadian Gas Association, Bigwin Inn, Lake of Bays, Ont., Canada, June 16-20.

American Society for Testing Materials, annual meeting, Atlantic City, N. J., June 18-22.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month. Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

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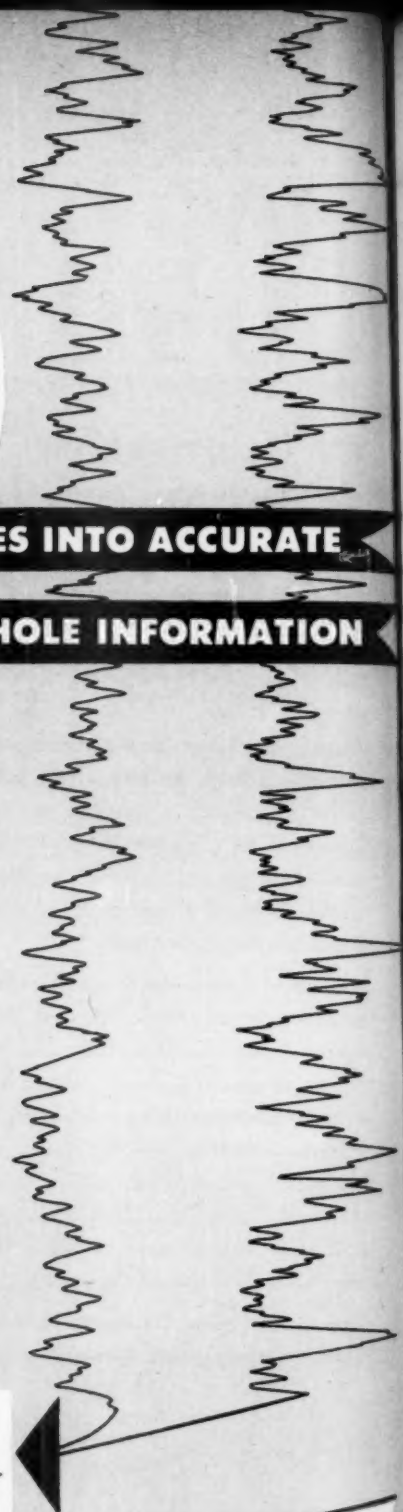

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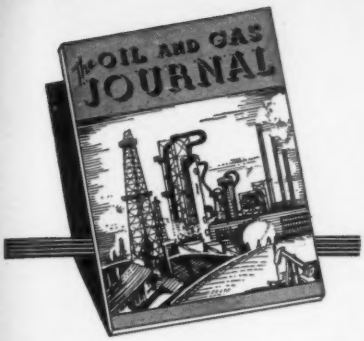

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JOURNALLY Speaking

Happy New Year?

WELL, the little guy with the three-cornered pants, top hat, and "1951" ribbon has chased the old gent with the hourglass off the stage, and here we go again on another new year. We all wished each other that it would be a happy one, but the greeting was usually exchanged with a decided note of underconfidence, what with the world situation being what it is, the price of crude frozen, and steel hard to get even on the black market.

However, we have been told that things are never so bad that what they could be worse, and happiness is only relative, so maybe a year from now we will look back on 1951 and agree that it was happier than the pessimists had predicted. We live only one day at a time anyway, so what's the use of worrying about the future? As of today, at least, no A-bombs have been dropped, oil is still being discovered and produced, and the Government hasn't taken over the industry entirely. If that keeps up for another 361 days you may be able to write off 1951 as a relatively happy new year.

Fruity Geology

ACCORDING to a press report, which may not be a thoroughly scientific summary, the Carnegie Institution of Washington has concluded that the crust of the earth is not neatly laminated like a layer cake but instead the rocks are all mixed up like a Christmas fruit cake. This may explain some dry holes. Your wildcat may bite into a hard piece of nutshell instead of the juicy plum you hoped for.

The Egg and Oil

WHOLESALE and retail prices of eggs hit a 30-year high, the Government's price bulletin announced, the same week that the Government slapped a "quick freeze" on oil prices.

So far as this department can learn, the Government was scared into the oil freeze by nothing more than the audible sighs of a few oil men who noted that their costs are going up pretty fast. For some time we have heard rather loud complaints from our own commissary department about the rising prices of eggs and other things, but apparently Government ears aren't attuned to eggs as keenly as they are to oil. It set us to wondering how the egg and oil compare in such factors as finding costs, depletion rate, and dry-hole ratio.

Basic Essential

THE basic essentials of life are no longer the classic three—food, clothing, and shelter. In the United States the automobile is now a basic fourth. So states a spokesman for the automobile industry, citing a flock of figures to prove that without the family car our cities would disintegrate and economic activity throughout the nation would come to a standstill.

This discovery was made years ago by the nation's jokesmiths, who turned out such quips as: "Wanted—Garage with living quarters attached." However, it is comforting to the oil industry to have this confirmed and proved. Oil men always assumed they were in a fairly important business, but now they can support the claim that they are supplying one of the basic essentials of the existence of life itself.

It is to be hoped that the Washington planners take due note of this situation when they get around to putting the nation on the "austerity diet" we have been promised. Comic books we might get along without, football games maybe, and even, if worst comes to worst, television. But take away the automobile—or the gasoline to run it—and life would be not only unbearable but impossible.

Atomic Balm

THERE is said to be balm in Gilead, and it now appears that there is even a little balm in all this fear and confusion about the atomic bomb. The Atomic Energy Commission is releasing information on the use of nuclear reaction for generation of power. This work is still in the experimental stage, but at least it offers a glimmer of hope that eventually civilization will get something constructive out of this atom-splitting business. Balm for bomb, so to speak.

—*Henry D. Ralph*

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LONE STAR CEMENT CORPORATION

the OIL AND GAS JOURNAL

January 4, 1951

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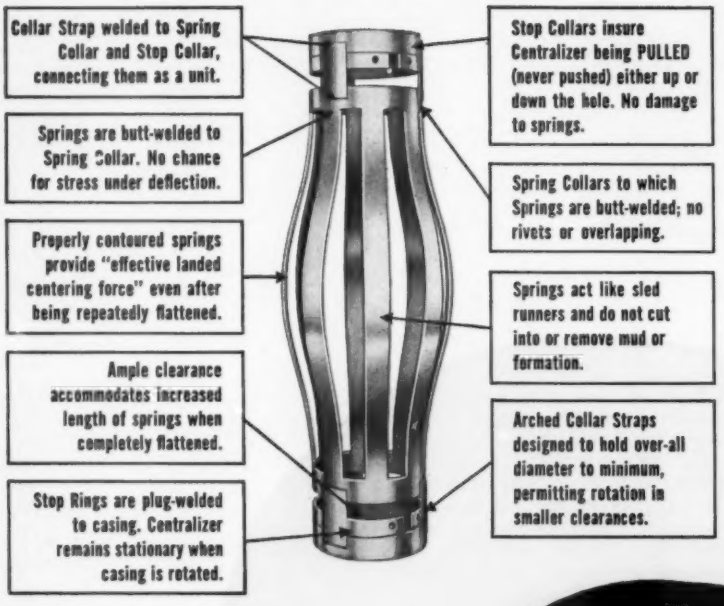
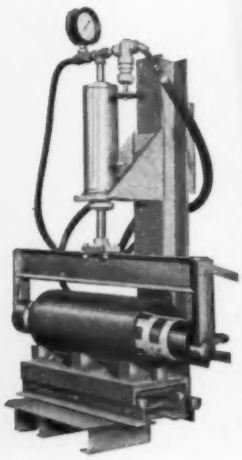

Collar Strap welded to Spring Collar and Stop Collar, connecting them as a unit.
Springs are butt-welded to Spring Collar. No chance for stress under deflection.
Properly contoured springs provide "effective landed centering force" even after being repeatedly flattened.
Ample clearance accommodates increased length of springs when completely flattened.
Stop Rings are plug-welded to casing. Centralizer remains stationary when casing is rotated.
Stop Collars insure Centralizer being PULLED (never pushed) either up or down the hole. No damage to springs.
Spring Collars to which Springs are butt-welded; no rivets or overlapping.
Springs act like sled runners and do not cut into or remove mud or formation.
Arched Collar Straps designed to hold over-all diameter to minimum, permitting rotation in smaller clearances.

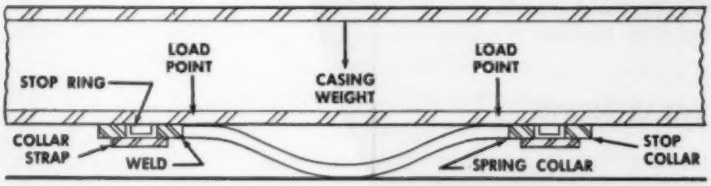
EASY STARTING WITHOUT "SNUBBING"

Testing to determine the maximum number of springs, of optimum bowed height and length, to insure easy starting, particularly of the first few joints when there is no accumulated weight. Minimum interval spacing of Baker Model "G" Casing Centralizers also was determined with this testing equipment.



With this testing device it is possible not only to simulate rugged downhole travel by repeatedly flattening the springs, but also to find the effective centering force of the centralizer in the open hole, after such treatment. The maximum centering force is easily determined from a performance curve showing the centering force at various intervals of deflection.

Operators who know ALL the facts about the Baker Model "G" Casing Centralizer specify and run them exclusively. They know from experience that they are buying the greatest possible centering force for their casing, to be applied *exactly where they want it in the hole.* Isn't that what you too expect and really want from a casing centralizer?



Here is the ideal in spring design and mounting, found only in the Baker Model "G" Casing Centralizer. Note how the load point is imposed directly upon the casing; and how the properly "contoured" spring is free to move along the smooth surface of the casing as it deflects under compression. There is no chance for concentration of stress to cause a permanent set, or to result in breaking of the spring. Note that ample clearance exists between Stop Rings and Spring Collars to accommodate the increased length of the springs which results from their complete flattening.

Additional interesting facts and illustrations are contained in a new 16-page brochure which proves conclusively that no other spring-type centralizer even approaches the EFFECTIVE LANDED CENTERING FORCE afforded by the Baker Model "G" Casing Centralizer. Ask for your copy today from any Baker office or representative.

BAKER OIL TOOLS, INC.
Houston • LOS ANGELES • New York

New Year

Seldom has a year ended more gloomily than 1950. Everywhere there was fear, uncertainty, bewilderment. In vain industry groped for a rallying point, a bench mark, a program.

Following Pearl Harbor the nation was mad clear through and was fired with action and determination. But the reaction to the tragic international events of recent months has been more of despair and fatalism.

As 1951 opens, however, there are signs that the nation is rousing itself from despondency. Hope for peace springs anew, and men are beginning to lay plans to reinforce that hope. A resurgence of positive action and a degree of optimism are discernible.

The oil industry, it seems to us, is in the vanguard of this rebirth of faith in the future. With characteristic optimism and action, oil men are planning and working to be ready to meet any demands and any difficulties. The year-end statements of oil-industry leaders reflect a calm realism and a justified assurance in the strength of our industry and our nation.

This may not be a happy year for oil or for anyone, but it should not be a year of floundering. By now it should be clear that the cards are down and that the stake is our way of life. Now is the time for action, for production, and above all for confidence and a fighting spirit.

Oil will be required to win any kind of war, hot or cold, in any part of the world, and our industry can supply the oil by the qualities for which it is outstanding—optimism, enthusiasm, ingenuity, daring, perseverance, and plain American guts.

Our industry can do more than supply oil. It can instill these same qualities into others and thus lead in mobilization of the nation's determination to see this thing through to a victorious end.

It has been well said that we have the most oil not because America has the most resources but because Americans have the most resourcefulness, because of our competitive system and its rewards for the aggressive and the successful. This system and all that goes with it is now challenged from abroad. If oil men and all Americans believe anything, they should believe that this system which has made and kept us great for generations has within itself the righteous strength to beat down this alien threat no matter what form it may take.

The oil industry's self-confidence in this national emergency and its positive actions in getting ready for the worst while hoping for the best display a welcome quality of leadership. This is the spirit which can rally the nation to a state of fighting efficiency.

The despair and inaction which marked the end of 1950 are now being displaced by grim determination which shows signs of crystallizing into national programs of action. This will breed confidence and optimism, and with these the new year can be made a far better one than the old.

THIS WEEK

STATE LEGISLATURES—Natural gas expected to hold limelight during Texas legislative term, as factions seek increased severance tax, minimum price for fuel at well head, and export levy on all gas shipped out of state. . . . ¶Changes in Oklahoma's unitization law, amendment of L.P.G. laws to eliminate discriminations against local tank manufacturers to be laid before state legislature. . . . ¶Field-wide unitization program sought by Arkansas Oil and Gas Commission. . . . ¶Kansas interests seek 3 per cent severance tax on oil in addition to present ad valorum taxes. . . .

STEEL—Oil producers having to resort to abnormal measures to secure 18 to 55 per cent of their tubular-goods requirements, I.P.A.A. discloses. . . . Small operators encountering most difficulty in getting supplies from mills or warehouses. . . . ¶American Iron and Steel Institute estimates production of line pipe approximated 3,700,000 tons during 1950. . . .

INDUSTRY—Various factions ask ESA for fluctuating petroleum price controls in order to bring out additional supplies as necessary. . . . ¶Socony-Vacuum and affiliates set up sabotage-reward funds to employes volunteering information which leads to conviction of any person damaging company equipment. . . . Analysis of exploratory ventures for oil and gas shows that many wells which do find production are financial failures. . . . ¶Ten per cent increase in tank-car mileage allowance for loaded and empty cars granted by Association of American Railroads.

TRANSPORTATION—Shortage of pressure tank cars created by prolonged cold weather prompts PAD to urge propane suppliers to make every effort to increase utility of cars by arranging for prompt unloading and dispatch of empties. . . . ¶Tanker-pooling program being developed to make additional tonnage available to Military Sea Transport Service. . . .

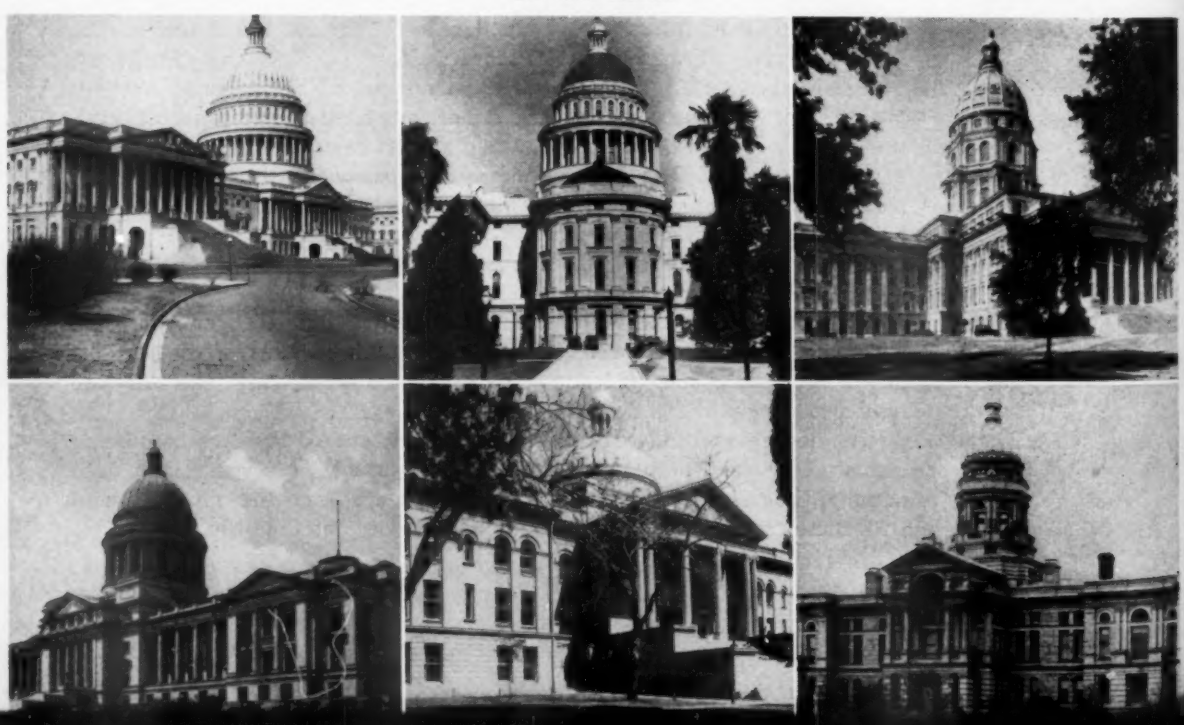
WASHINGTON—ESA warns that failure of sellers to observe price-maintenance standards issued by stabilization director will result in investigation and possible issuance of legal ceilings. . . . ¶NPA moves to prevent excessive accumulation of wide range of materials important to defense, civilian production. . . . ¶NPA sets up facilities and construction bureau to speed up industrial expansion needed for defense. . . . ¶Rubber is first article to be made a federal monopoly. . . .

ACTIVITY—Crude production for week ended December 30 averaged 5,693,550 bbl. daily, up 12,450 bbl. daily from previous week. . . . ¶Well completions for the week totaled 814 compared with 847 a week earlier. . . . Wildcat completions increased 21 wells to 173 for the week. . . . ¶Rotary rigs operating in United States on December 23 decreased to 2,366 from 2,395 the previous week. . . .

TRENDS—Probable crude-production rate for January is estimated at about 5,700,000 bbl. daily. . . . Crude imports have been averaging about 550,000 bbl. daily. . . . ¶Crude exports, transfers, and losses will average about 150,000 bbl. daily. . . . ¶Crude supply will support refinery runs of about 6,100,000 bbl. daily without reductions in crude stocks. . . .

INTERNATIONAL—I.P.C. to serve as advisor in operation of Colombia's De Mares concession. . . . ¶Agreement reached between Aramco and Arabian Government providing 50-50 per cent split of company's net operating profits. . . .

DOMES.—From these and similar domes throughout the country may emerge legislation of vital importance to the oil and gas industry. With a new Congress convening this week and the legislatures of 42 states meeting in regular session in January, 1951 may see many new laws enacted.



Texas Oil Legislation

Natural gas may be in limelight during legislative term; increased severance tax, minimum price, export tax talked

Leigh S. McCaslin, Jr.

AUSTIN.—There is a good possibility that natural gas will be in the limelight during the forthcoming session of the Texas Legislature which convenes January 9.

Three facets of the subject of natural gas are expected to receive attention from the legislators. The most likely one is an effort to increase the gas severance tax, now 5.72 per cent of value at the well head. Secondly, there may be agitation to set a minimum well-head price for gas. In the third place, the old issue of a tax on gas which is exported from the state may be aired.

Severance tax.—The effort to increase the gas severance tax was brought into the open several weeks ago when the County Judges and Commissioners Association of Texas went on record favoring such a measure. In a close vote of 125 to 115, the group asked for the increased rate to build and maintain rural roads. A bill proposing this action was defeated at the last session of the legislature.

Minimum price.—Agitation for a minimum well-head price on gas is expected as a result of the U. S. Supreme Court's decision upholding the right of the Oklahoma Corporation Commission to set a minimum price in Guymon-Hugoton field. Royalty owners and producers would obviously favor more money for their gas. However, R. L. Foree, an independent producer of Dallas, says that "an order by any governmental body fixing prices carries with it certain problems quite possibly capable of offsetting any advantages received." Foree's statement has particular significance because he is president of the Texas Independent Producers and Royalty Owners Association.

On this same subject, Foree says, "Many oil and gas independents see in this decision an instrument for the promotion of the end-use control philosophy, a threat to the industry and public welfare second to none today. Particularly is such a proposal dangerous at this time when the public in general is disposed to accept any federal regulation which is represented to it as in the interests of national security."

Export tax.—The proposal to tax gas which is being piped out of the state has been a "hot potato" in Texas politics for some time. This despite the fact that the United States Constitution forbids state taxes which burden interstate commerce. Proponents of such a tax include not only those who want to raise more money, but also those who think that rapidly expanding export will eventually cause a shortage in Texas.

The Dallas Morning News expressed its editorial opinion on exports recently and pointed out that more than half of the tremendous industrial development of Texas during the past 10 years "must be credited to the existence of gas in quantities sufficient in volume for industrial use."

Revenue needed.—All three of the gas measures expected to come up before the legislature bear on increased revenue for the state. (A minimum well-head price would increase the value of gas sold, in some cases, thus giving the state a higher income from its gas severance tax.) Increased revenue, or more bluntly, higher taxes, is expected to be the major matter of concern for the legislature. Estimates on additional money needed vary between $60,000,000 and $100,000,000 for the biennium 1951-53.

This huge need for money does not include any new appropriations which might be made during the coming session. The expected deficit is largely a result of an expanded educational system and a $15,000,000 annual farm-to-market road program.

Other sources.—Prospects for passage of the three gas measures are not particularly good. More likely, it is felt by many observers, an increase will be made in the rates of the omnibus tax bill. This bill is a catch-all which provides for taxes on such diverse items as oil, gas, sulfur, automobile sales, beer, wine, radios, insurance premiums, and playing cards. A temporary 10 per cent increase in the rates under this bill was invoked by the last legislature. This increase may be made permanent. It is also felt that other taxable items may be added to the bill.

Other major tax measures which will probably receive consideration are a state sales tax and a state income tax. These two taxes have not been very popular in the past with Texas legislatures. It is also possible that a bill to tax refinery products may be reintroduced. The last session had a bill designed to remove the levy on retail gasoline sales and replace it with a tax at the refinery. This measure would result in residents of other states paying a good share of the Texas gasoline tax bill.

Unitization Revamp

Changes in Oklahoma law to be laid before legislature

OKLAHOMA CITY.—A revamped unitization set-up for Oklahoma which has the general endorsement of state operators and royalty owners is slated to be laid before the Twenty-third legislature officially opened January 2.

The new proposal, which appears to be the major piece of oil legislation due to come up before the new legislature, would require as one of its provisions approval of unit programs by operators holding at least 51 per cent of lease acreage and by royalty owners holding at least 51 per cent of royalty interests exclusive of royalty held by operators in the unit.

Royalty owners protest.—Opposition to this provision was encountered when a group of royalty owners centering in the Grady and Stephens County area held out for approval by 75 per cent during meetings with the special legislative council committee studying state unit operations in November and December when the proposal was drafted. Operators claim so high a figure would prevent unit operation due to widely scattered royalty holdings. This problem will be submitted to the legislature for final determination.

Other provisions of the bill in its present form would eliminate the requirement for filing of unitization petitions by lessees holding at least 50 per cent of the lease acreage, and strike out the clause contained in the unitization law passed in 1945 for prevention of unitization through protest of 15 per cent of the leaseholders.

Other amendments.—In addition, the proposal would eliminate the provision of the old law which granted each lessee within a unitization area representation on the operators' committee in proportion to his interest, and would strike out the portion relating to appeals to the state Supreme Court from commission orders on unitization.

The Corporation Commission would be authorized to enforce the act. A clause would be attached that acreage to be included in the unit be productive of oil and gas, and sections providing for enlargement of unit area and amendment of unit plan would be revised.

Presiding as chairman over the committee drafting the proposal was Sen. Frank Mahan of Fairfax. During

committee studies, visits were made to unit projects in Illinois, Arkansas, Louisiana, and Texas, as well as different parts of Oklahoma.

L.P.G. legislation.—The state committee on labor, commerce, and industries has recommended that L.P.G. laws be amended to eliminate discriminations against local tank manufacturers, to reduce the amount of fees for small-size L.P.G. tanks, and to abolish positions of the four L.P.G. inspectors which was created in 1949.

New Unit Plan

Field-wide unitization is sought by Arkansas group

LITTLE ROCK.—Among measures expected to be introduced in the Arkansas State Legislature which will convene January 9 is a bill to permit the Oil and Gas Commission to force field-wide unitization.

Only a few weeks ago the state's Supreme Court ruled that the commission does not have authority to compel field-wide unitization even if "substantial waste" would occur otherwise. The case before the court involved the 5,000-acre McKamie-Patton field in Lafayette County. B. H. Dobson, a royalty owner, challenged the action of the commission and was upheld by the Supreme Court although lower courts had upheld the oil body.

As a result of the decision, oil operators are expected to make some effort towards a law giving the Oil and Gas Commission compulsory unitization authority. Five Arkansas fields, in addition to McKamie-Patton, are currently being operated under field-wide unitization—all on a voluntary basis. They are Shuler field, Union County; Wesson field and Stephens Hogg Sand Unit, Ouachita County; and Hainesville and Dorcheat-Macedonia fields, Columbia County.

Major problem.—The major problem facing the Arkansas Legislature, or 1951 General Assembly, as it is properly known, is the age-old one of taxes. A writer for the Arkansas Gazette summarized the state's situation by saying: "Financially, the state could be compared with a harassed family man who has exhausted his savings, received a salary cut and heard rumors of another. His wife, nevertheless, wants a new house and a mink coat."

Among other tax measures, it is expected that Gov. Sid McMath will recommend an additional 1 cent a gallon in the tax on gasoline. The gasoline tax already brings in more than one-fourth of all state taxes collected. In 1949, the total was $21,984,000. Severance taxes in Arkansas, which ranks tenth in oil and gas production, brought in revenue of $3,390,000 in 1949.

Gross-Production Tax Sought

TOPEKA.—Another attempt will be made by various interests to induce the Kansas Legislature to approve a gross-production tax on oil but industry men believe the efforts will be defeated again this year.

Gov. Edward F. Arn, elected last November, has stated that there will be no additional taxes on the oil industry, and business leaders think they can beat down any concerted effort to pass such a bill. Factions are seeking an additional 3 per cent severance tax in addition to the present ad valorum taxes.

Another possibility of legislative action is enactment of some sort of pollution-control bill, although no one has brought forth any ideas which would effectively solve the problem. Pollution of streams has long been a thorn in the side of farmers, ranchers, and townspeople, and the high-sulfur content of crude in various areas has made the problem one of major proportions.

One spokesman for Kansas business interests has stated that the oil industry has "gotten itself in sort of a bad light up here" with the Kansas Legislature, and that the law makers were set to "take it out" on the oil business with some sort of new taxes this year.

INDUSTRY AFFAIRS

Wildcatting "Success"

Many wells that find some oil are financial failures, says F. H. Lahee in analysis of risks in hunting new major fields

Carl F. Hoot

DALLAS.—Just because a wildcat well is not classed as a dry hole doesn't mean that it is a commercial success.

Many wildcats technically listed as successful, in that they found some oil, do not produce enough to pay for the drilling. Failure to recognize this fact has led to some popular but erroneous conclusions about the industry's success in finding oil and the financial risk involved in exploration.

These are the conclusions of Frederic H. Lahee, prominent geologist of Sun Oil Co., Dallas, presented in the January bulletin of the American Association of Petroleum Geologists.

Despite the customary figures on dry-hole ratios, only 1 out of 243 rank wildcats discovers a new field with more than 10,000,000 bbl. of recoverable reserves, and only 1 out of 967 finds a major field—50,000,000 bbl. or more.

1,000-to-1 shot.—These figures were obtained by Lahee through analysis of A.A.P.G. statistics on exploratory drilling in 17 states in 1944, 1945, and 1946. Complete statistics on other states were not available prior to 1946, and he refrained from using later statistics because of the time required to determine reserves of a new field after initial discovery.

The 17 states account for more than 95 per cent of all the rank wildcats in the country and are considered fairly representative of the country as a whole. They are Alabama, California, Colorado, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Montana, Nebraska, New Mexico, Oklahoma, Texas, and Wyoming.

Rank wildcats.—Lahee's study is confined to rank, or new-field, wildcats, drilled expressly to locate new fields. Other classes of wildcats are outposts or extension tests, shallow-pool tests, deeper-pool tests, and new-pool wildcats.

New-field wildcats constitute more than 50 per cent of all exploratory holes, and the biggest risk of financial loss in exploratory drilling is in the drilling of these rank wildcats.

"In the 17 states covered," says Lahee, "our best data on the total estimated ultimate recovery of oil—that is, total production from date of estimate plus total recoverable reserves remaining on date of estimate—are for fields discovered by rank wildcatting in the years 1944, 1945, 1946. For each of these fields there have been at least 4 years of development history to show the extent of the original pool and how many other pools may be associated with this original pool in the same field.

Degrees of success.—"The new-field (rank) wildcats drilled in these 3 years (as in any year) may be divided into (a) those which were dry and failed to find any commercial production and (b) those which, although they were 'successful' in the sense that they discovered some production, were successful in varying degrees. This is a most important point, and one that should always be considered in measuring the risk in new-field (rank) wildcatting.

"There is a big difference in whether a new field has a total ultimate recoverable reserve of 1 million barrels or less; or of 10, or 25, or 50 million

DEGREES OF SUCCESS OF NEW-FIELD (RANK) WILDCATTING IN 17 STATES*

Year in which new fields were discovered	New-field wildcats which discovered new oil fields†	Number of fields discovered in year indicated having estimated total ultimate recoverable reserves of: Over 50 million barrels	Between 25 & 50 million barrels	Between 10 & 25 million barrels	Between 1 & 10 million barrels	Less than 1 million barrels: Still producing	Less than 1 million barrels: Abandoned	Dry new-field wildcats drilled	Total discoveries plus dry wildcats	Ratio of success in the total number of new-field wildcats drilled (for discoveries of fields of): Over 50 million barrels or better	Over 10 million barrels or better	Over 1 million barrels or better
1944‡	245	4	1	9	62	152	17	2,684	2,929	1 in 733	1 in 210	1 in 40
1945‡	252	2	2	9	42	173	24	2,578	2,830	1 in 1,416	1 in 219	1 in 52
1946§	257	3	1	5	64	162	22	2,680	2,937	1 in 980	1 in 327	1 in 41
Total of '44 to '46 inc.	754	9	4	23	168	487	63	7,942	8,696	1 in 967	1 in 243	1 in 44

*This area includes the following states: Alabama, Arkansas, California, Colorado, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Montana, Nebraska, New Mexico, Oklahoma, Texas, and Wyoming. These states included more than 95 per cent of the rank wildcat drilling in the United States. †This figure does not include dry-gas discoveries, nor pools at first thought to be new fields but eventually proved to be connected with old fields, nor does it include a few unimportant discoveries where reliable data were not available. ‡See Table XI, p. 798, Vol. 33, Bull., A.A.P.G., June 1949. §Reappraisal published in June, 1950. Bull., A.A.P.G., Vol. 34, p. 1008.

barrels, or more. Roughly speaking, and using averages for depth of drilling, number of field-development wells required to drill up a field, number of dry holes drilled to outline the edges of the field, and similar factors, we may assume that a field having a total ultimate recovery of 1 million barrels is, on the average, near the economic limit. In some districts such a small field will pay moderate profits; in others, there will be a net financial loss; all depending on factors of depth to the 'pay' or reservoir, difficulties in drilling, permeability and thickness of reservoir rock, accessibility, and other conditions.

The record. — "Referring to the accompanying table, and using the totals and averages for the years 1944 to 1946, we find that

"a. In the total number of new-field (rank) wildcats drilled (8,696), 8,005, or 92.1 per cent, were failures (dry and abandoned soon after completion); 487, or 5.6 per cent, discovered fields with a total ultimate recoverable reserve of less than 1 million barrels); 204, or only 2.3 per cent, discovered fields with a total ultimate recoverable reserve of more than 1 million barrels.

"b. Only 1 well out of every 44 new-field (rank) wildcats discovered a field with more than 1 million barrels of total ultimate recoverable reserves.

"c. Only 1 well out of every 243 new-field (rank) wildcats discovered a field with more than 10 million barrels of total ultimate recoverable reserves.

"d. Only 1 well out of every 967 new-field wildcats discovered a field with more than 50 million barrels of total ultimate recoverable reserves, that is, what we usually regard as a major field.

"These are figures which spell a very significant story of the risk involved in actual wildcatting. They are better than figures that might be taken from recent statistics, as for example, fields discovered in 1949, because these recent discoveries have not yet had time for development to demonstrate their size and capabilities of production. The figures for 1944 to 1946, inclusive, may be safely used as essentially representative of conditions today."

Man at Work

There was a time in the oil industry when pump-station gagers spent their working hours climbing up and down stairs to measure the fluid levels in all tanks which were either receiving or dispatching crude. This was done in spite of wind or weather—with possibly just a little judicious "boiler-housing" being done on occasions. But times are changing. This gentleman, G. A. Ahlstrom, is a Shell Oil Co. gager at its Bakersfield, Calif., pump station—at work. Instead of having to go to each tank he sits at this control panel in the tank-farm laboratory and merely reads the fluid levels of each tank. The eight receivers, which continuously and simultaneously show the levels in all tanks, also are equipped with high and low-level alarms to prevent overfilling and excessive withdrawal.

Higher Tank-Car Mileage

WASHINGTON.—Prolonged negotiations by the American Petroleum Institute and Manufacturing Chemists Association with the Association of American Railroads has resulted in the grant by the latter of a 10 per cent increase in the tank-car mileage allowance for loaded and empty cars.

A tariff granting the new rate of 2.2 cents per mile will be published by the railroads, effective January 1, and it is estimated the increase will amount to approximately $3,000,000 a year on the total tank-car fleet of about 150,000 cars, of which it is estimated something over $2,000,000 will go to owners of petroleum cars.

The mileage allowance is granted by the railroads to compensate shippers for the use and maintenance of privately owned equipment which the carriers do not furnish. The 2.2-cent rate is expected to be accepted by the car owners, who feel it falls short of compensating them for their costs, and an effort may be made later to secure another increase.

More Line Pipe Made

WASHINGTON.—The American Iron and Steel Institute estimated last week that 1950 production of line pipe will approximate 3,700,000 tons, about 203 per cent higher than the 1941 output of 1,222,500 tons.

Line pipe will represent about 41 per cent of the total pipe production which is seen as likely to reach a record high of around 9,000,000 tons. In 1941 the output of line pipe accounted for only 21 per cent of total pipe production, the institute said.

The total pipe production will be about 57 per cent higher than in 1941, and in addition to the 41 per cent which will be line pipe, about 19 per cent will be oil-country material, or something better than 1,700,000 tons. Approximately 29 per cent will be standard pipe of the type widely used in house and industrial construction, and the remainder will be boiler tubing, pressure tubing, mechanical tubing, and other types of pipe.

'Flexible' Controls Urged

Industry asks for fluctuating petroleum price controls in order to bring out additional supplies as necessary

Dahl M. Duff

NEW YORK.—The need for "flexible" petroleum price controls in order to bring out additional supplies as necessary was urged on the Economic Stabilization Agency from several different directions last week.

Developments indicated further the industry's general compliance with the December 18 request from Washington to leading oil companies that they voluntarily hold the line on prices.

At the same time, the feeling was plain the Washington authorities must recognize the necessity of price adjustments to encourage seasonal refinery yield changes, cover still-rising tanker rates, and meet the increased import duty effective January 1.

Tanker rates.—Marketers along the eastern seaboard were concerned over the fact price freeze on products as of December 18 does not take into account the marked increases which are taking place in tanker rates. In some instances, these tanker charges are nearly three times what they were 6 months ago.

These tanker rate increases affect most directly the independent marketing companies who use the spot-rate vessels. The larger integrated companies use their own fleets and ships on long-term charters which have been less involved in the rate increases.

A further source of concern to the marketers lay in reports that an increase of approximately 20 per cent is scheduled to be made in barging charges in the New York area after January 1. Barge operators for their part said that towing charges had been raised between 18 and 20 per cent and that labor and other expenses had increased.

These and other developments appeared to give weight to the opinion expressed earlier by some oil officials that the Washington technique of a voluntary freeze on selected commodities, including petroleum, will prove unworkable in the long run. To be effective and fair, controls must be placed on all elements of costs, including labor, and must be enforced.

Refinery yields.—Cities Service Co., one of the few companies making public the text of their replies to the December 18 request from Michel V. DiSalle, price stabilization director, called the federal agency's attention to the fact that normally petroleum industry's prices allow for adjustments to compensate necessary seasonal refinery yield changes.

While assuring its cooperation with the voluntary program to hold the price line, the company said it assumed DiSalle would take into consideration the necessity of seasonal yield changes, "not only in connection with the price analysis you are presently making, but also with respect to any future action you may take affecting petroleum prices.

"Your attention is further called to products made from foreign crude over which domestic companies have no control as to prices," the company's reply to DiSalle said. "As an example, our company makes substantial amounts of asphalt from heavy Venezuelan and Mexican crudes. Should prices of these crudes advance, it would be necessary to make corresponding price adjustments in the same products, and we assume you contemplate allowing flexibility to take care of such situations.

"Local situations such as temporary price wars will be found to exist at any given time which have the effect of causing prices to be subnormal for the localities affected. Price freezes, either voluntary or by regulation, should make allowances for these conditions."

Higher tariff.—An even more forceful recommendation along similar lines was made in another message to DiSalle from the Atlantic Coast Oil Conference, an organization of suppliers, jobbers, and distributors. The conference pointed out that as a result of last summer's abrogation of the Mexican trade agreement, the import duty on a large part of the petroleum imports will be increased to 21 cents a barrel.

The increased tariff rates will result either in higher prices for product and crude, or "the volume of imported petroleum will diminish in face of a record demand that is difficult to meet even under present supply conditions." Present high tanker rates also underscore the need for price flexibility, the conference's letter declared.

"The military needs for tankers give little encouragement to any possible reduction in these rates," it said. "At the same time this cost of transportation must find its place in the determination of prices along the East Coast. This is an economic 'must' if we are to have the home-heating oil this winter for our heavy consuming areas and the residual fuel oil to help run our essential industries so vital to the defense effort."

Robert G. Dunlop, president of Sun Oil Co., wired DiSalle that the company would make every effort to comply with the request. "However, we do not control crude oil or refined product markets and must meet markets established by our competitors or close our plants," he told DiSalle. "You can be sure we will initiate no price advances without keeping you fully advised."

Sabotage Defense

Socony to offer rewards for evidence if damages occur

NEW YORK.—An offer to pay rewards for evidence in case of sabotage resulting in injury to employes or damage to company or employe property has been made by Socony-Vacuum Oil Co., Inc., and its two major domestic affiliates, General Petroleum Corp. and Magnolia Petroleum Co.

The company has set up a schedule of rewards to be paid under different circumstances for evidence leading to a conviction for sabotage. An object of the plan, according to Socony-Vacuum, is "to increase protection of personnel and plant by encouraging the enforcement of existing laws."

Greatest danger.—A company announcement said that the management believed that sabotage is one of the gravest dangers to national security and that the company "should take appropriate preparedness measures just as our Government is doing." At the same time, the company said it does not regard war as "necessarily imminent."

Total to be paid for each of the three companies is limited to $100,000 unless it is decided to increase this maximum. Posters informing employes of the plan are being placed in the companies' refineries and other installations.

The company said it will pay $25,000 to anyone who voluntarily produces evidence which leads to the conviction of a person for a deliberate act of sabotage against the company when the act results in death or permanent disability to any employe or member of an employe's family.

A $10,000 reward will be paid under similar circumstances in connection with an act of sabotage causing injury to an employe or member of his family. A reward of $2,000 will be paid for evidence leading to conviction of anyone responsible for an act of sabotage which results in damage of $1,000 or more to company property.

Property damage.—In addition, the company said it will reimburse any employe up to $5,000 over the amount recoverable from his insurance for property damage arising from an act of sabotage in which Socony-Vacuum is involved, provided the damage occurs without fault on the employe's part.

Transportation Pinch

PAD asks speedup in use of pressure tank cars, initiates pooling of ocean tankers, studies building more barges

Bertram F. Linz

WASHINGTON. — The Petroleum Administration for Defense acted last week to cope with a shortage of pressure tank cars created by prolonged cold weather which has increased the demands for propane in many sections of the country.

In telegrams to propane suppliers Deputy Administrator Bruce K. Brown urged that they make every effort to increase the utility of cars by arranging with customers for prompt unloading and dispatch of empty cars, use of trucks to maximum advantage in short hauls and arranging by exchange or other means to shorten hauls and avoid crosshauls.

Brown explained that the cold-weather shortage, which occurs to more or less extent every winter, has been accentuated by the increased use of cars to move butylene for synthetic rubber and 100-octane aviation gasoline.

An as yet unspecified number of pressure cars is included in the freight-car construction program now getting under way, but whether that program will be adequate to meet increasing needs in the future is doubted by Brown, who now is collecting figures and estimates as to requirements as least a year in the future.

PAD officials also are conferring with the Defense Transportation Agency on the latter's barge and inland-tanker construction program which will be worked out with the National Production Authority in the next few weeks.

Tankers.—Also in the field of transportation, Dene Hodges, PAD director of transportation, reported that progress is being made in developing a tanker-pooling program to make additional tonnage available to the Military Sea Transport Service. That program, however, is not expected to be finalized before late in January and a request has been made to tanker operators to make arrangements with the MSTS to supply additional tankers to fill January requirements.

A drafting committee set up at recent conferences between PAD and tanker operators has prepared a tentative proposal which is now being studied. One of the questions still to be settled is the extent to which foreign-flag tonnage shall be included in computing a base for the plan, which will, in general, be similar to the arrangement in effect during World War II.

The program now being worked out is expected to be adequate as a basis for expansion of a pooling system if over-all control of transportation becomes necessary.

Benzene.—Brown disclosed last week that a committee which has been studying various methods of increasing the benzene supply has made its report, and also that several benzene projects have been submitted for necessity certificates permitting accelerated amortization and for approval of Reconstruction Finance Corp. loans.

A stumbling block to rapid expansion of benzene, however, is the uncertainty over the long-term market. While some of the applications make no reference to this situation, Brown said, others are contingent upon the development of 5-year contracts for output, and the upshot may be that the Government will have to enter into such contracts in order to get needed supplies.

Prices.—It was revealed that Economic Stabilization Agency officials consulted with PAD before making a request last month that West Coast refiners rescind their latest 25-cent increase in crude prices. Brown refused to say what his agency had recommended but let it be known that it has taken a firm stand against the imposition of any ceiling price on aviation gasoline.

Brown explained that it was found during the last war that it was undesirable to put a ceiling on avgas, and a system was finally worked out whereby the Petroleum Administration for War audited and certified the refiners' claims for extra costs incurred in the various expedients resorted to in the effort to increase the supply.

A similar situation now prevails as a result of the efforts to speed up output by transfers of butylene between refineries, and ESA was told that the refiners should be permitted to submit their bills for PAD audit and certification of additional costs.

Brown commented that NPA has acted promptly to cooperate in the avgas program.

Appointments. — Richard C. Lawton of Magnolia, Ark., has been appointed director of the production division of PAD. Lawton is president of Lawton Oil Corp. which operates in Arkansas, Louisiana, Texas, and New Mexico, and is well known as an independent producer. He is expected to reach Washington and take over his new duties within a few days.

The 1951 membership of the National Petroleum Council is being worked up but is not expected to be announced for another 2 weeks, possibly after the completion of discussions with the Department of Justice as to whether it can continue to operate as an advisory body, as in the past, or comes within the category of industry committees which, under the Defense Production Act, must be headed by a full-time government official.

Tubular Goods

Regular channels fail smaller oil operators

WASHINGTON.—Petroleum producers are having to resort to abnormal measures to secure from 18 to 55 per cent of their tubular-goods requirements, with small operators encountering the most difficulty in getting supplies from mills or warehouses, it was disclosed last week in a report by the oil and gas field-materials committee of the Independent Petroleum Association of America.

The report was based on 278 usable responses out of 375 received on a questionnaire sent out by the committee covering operators using from less than 200 to more than 5,000 tons of pipe a year, asking for information on procurement during the fourth quarter of 1950. The responding producers, located in 20 states, use an aggregate of 295,822 tons of oil-field tubular goods a year or about 18 per cent of the total.

Irregular sources.—The committee reported that while in normal times producers obtain more than 90 per cent of their requirements from regular sources at mill or out-of-stock prices, they were able during the fourth quarter to obtain only 73 per cent in that manner, with an additional 8 per cent obtained from second-hand pipe and the balance through irregular channels at premium prices. These irregular channels provided 7 per cent through the gray market, 6 per cent through conversions, 3 per cent through oil-for-steel or tie-in sales, and 3 per cent through imports.

The survey showed that the larger operators were in better position with respect to supplies from regular sources, those using over 5,000 tons a year reporting 82 per cent, but the smaller operators were in less favorable position, those using between 201 and 5,000 tons a year getting 60 per cent while those who use less than

200 tons a year secured only 45 per cent.

Gray market.—As a result, the committee said, the smaller operators are forced to resort to a greater extent to the gray market, those using 200 tons or less a year having to secure 24 per cent of their requirements in this manner, while those using over 5,000 tons annually went into the gray market for only 4 per cent of their needs.

The committee did not survey exports of steel tubular goods but commented in its report that government statistics show they have increased about eight-fold over the 1935-39 average and currently amount to almost 500,000 tons a year.

Oil Prices

ESA sets standards for using profits as guide

WASHINGTON.—Failure of sellers to observe the price-maintenance standards issued by Price Stabilization Director Michel V. DiSalle will result in "investigation, consultation, and possible issuance of a legal ceiling," it was warned last week by the Economic Stabilization Agency.

In its first interpretation of the standards, designed as the basis for a general voluntary price freeze, the ESA emphasized that no seller is to be required to operate at less than the average of his normal 1946-49 profits and explained in some detail the conditions under which prices may be increased.

No company need stand a loss on a product longer than necessary to establish firmly that a loss is actually being incurred, and gross margins are to be defined and calculated in accordance with the customary practices of the trade, it was stated.

The ESA explained that the 1946-49 period was selected as a basis for figuring profits rather than the high-volume, high-profit period of 1950 because "in view of the shifting relationships among firms and industries, a base period needs to cover at least several years.

"Furthermore," it was pointed out, "half of 1950 reflected the price movements which occurred after Korea."

The interpretation also stressed that the price standard does not limit profits to those of the base period but, on the contrary, "permits price increases when necessary to preserve the profits of this period, and is thus in a sense a minimum guarantee."

Hoarding Is Illegal

WASHINGTON.—The National Production Authority last week moved to prevent excessive accumulation of a wide range of materials important to both defense and civilian production.

In an announcement (NPA Notice

WATCHING WASHINGTON

Bertram F. Linz

Too Much, Too Soon

Organized business sees in the establishment of the Office of Defense Mobilization and the first efforts of the Economic Stabilization Agency to freeze prices and wages a buildup for direct controls over our day-to-day economic life both unnecessary and unwise.

Petroleum-industry observers express bewilderment over the reasoning which led to a specific appeal by the ESA to freeze oil prices, which have increased only 0.4 per cent since the Korean invasion as compared with 10.2 per cent for all commodities, and to roll back the price of West Coast heavy crude which was still 45 cents under the 1948 price, allegedly without consultation with either the industry or the Petroleum Administration for Defense.

Businessmen generally are asking what we will have for an all-out war if complete control of the economy is imposed, in the effort to get ready for war, before other methods of combating inflation and increasing production are undertaken.

The specific point they make is that the administration has not been willing to adopt fiscal-monetary and debt-management policies which will keep money spending in line with the supply of goods, getting at the causes of inflation. Price controls, they argue, merely make things appear cheaper than they are.

It is pointed out that price control discourages production even in most urgent lines, and the suggestion has been made that if selective controls are to be used they be applied first to nonessentials in order to divert manpower and materials to essential lines.

CMP Coming

Adoption of a controlled-materials plan within the next 3 or 4 months now appears inevitable, probably as soon as the defense agencies can find quarters in an already overcrowded capital for the large organization necessary for its administration.

Each week brings further evidence of spreading confusion under the present priorities system, particularly in the steel industry, where many mills are taking DO orders for tonnages far in excess of the limits they are required to accept and are cutting back heavily on the quotas of regular customers.

In these circumstances, even if the National Production Authority approves the steel tonnage for the oil and gas industries requested by the Petroleum Administration for Defense there is grave doubt whether all of it could be provided unless some formal method for distribution of all steel products is set up.

PAD has a number of programs in mind—for tanker and barge construction, avgas, and other refinery expansion, and provision of tubular goods reserves for distressed operators among them—but there is no way of definitely assuring that steel will be available for these projects under the present system.

Exit Marshall Plan

The Marshall plan may be terminated this year, a year ahead of schedule, to be replaced by an aid program more closely geared to Europe's rearmament effort.

The matter reportedly is being given consideration in administration circles, where it is believed it would receive the approval of Congress, which is going to be called upon to appropriate possibly as much as $75,000,000,000 for governmental activities and the defense program during the fiscal year 1952.

So far, some $10,750,000,000 has been spent under the Marshall plan but European requirements for assistance in reviving the general economy are tapering off. On the other hand, Europe will be called upon to undertake an extensive defense program, to be tied into our own rearmament effort, and will have to get considerable financial aid to make a go of it without threatening the recovery that has been accomplished over the past 2 years.

In some Washington circles there is a belief that Europe has been dragging its feet in preparing against the possibility of another war, a charge that would be brought up in Congress if further multibillion-dollar Marshall-plan appropriations were asked without any provisions designed to stimulate preparedness in the participating countries.

So far, it would seem that only England has displayed any willingness to rearm, while the continental countries, which now probably have as much manpower as before the last war and close to as much production, appear to have little heart for what they fear would be a futile attempt to stop the Russians, should they start a drive to the English Channel.

1), the agency put industry on notice that excessive inventories of any of a large number of specified materials would be considered hoarding in violation of Section 102 of the Defense Production Act which prohibits the holding of materials in excess of the reasonable demands of business, personal, or home consumption, or for the purpose of resale at prices in excess of prevailing market prices of materials, the supply of which would be threatened by such accumulation.

Among the materials listed by NPA are steel pipe and tubing and other shapes and forms; benzene, styrene and polystyrene, and a number of other chemicals; lumber and cement; and aluminum, copper, tin, zinc, and other controlled metals and products thereof.

Industrial Building

NPA bureau will expedite construction for defense

WASHINGTON.—The National Production Authority set up a facilities and construction bureau last week to speed up industrial expansion needed for defense.

The bureau will include an industrial-expansion division specifically charged with speeding up the construction of new plants, which will work with various industries and, where necessary, take steps to obtain materials and equipment for their quick completion. The division will be complemented by a building-materials division with responsibility for the production and distribution of building materials and a construction-controls division which will handle NPA activities relating to construction programs and controls.

There will also be a tax-amortization division which, in cooperation with other interested government agencies, will help speed up the rearmament program by recommending the issuance of certificates of necessity. A loan division will issue NPA loan certificates authorizing the Reconstruction Finance Corporation to make direct loans needed to help expand production.

The bureau will be under the direction of Assistant Administrator Frank R. Creedon, former construction manager for General Electric Co. at the atomic-bomb plant at Hanford, Wash. During the war Creedon directed the government construction program of ordnance and chemical warfare plants and later became deputy rubber director in charge of construction for the synthetic-rubber program.

U.S. Now the Buyer

Rubber is first article to be federal monopoly

WASHINGTON. — The Government last week, for the first time, invoked the provisions of Section 303-A of the Defense Production Act authorizing it to purchase metals, minerals, or other raw materials.

At the direction of the National Production Authority, with the approval of the National Security Resources Board, the General Services Administration became the exclusive importer and distributor of natural rubber for the United States. The making of new contracts for the importation of rubber was immediately prohibited, but existing contracts will be permitted to remain in force unless they are found to interfere with the operations of the exclusive-buying program.

Since the Government already owns almost all of the synthetic-rubber industry it now has virtually full control of the distribution and use of the commodity.

The purpose of the government monopoly, it was explained by NPA Administrator William H. Harrison, is "to safeguard the supply of rubber and assure that it is distributed and utilized most advantageously to the national defense."

Coincident with the designation of the GSA as exclusive buying agency, NPA amended its rubber-control order to prohibit the private importation of crude rubber or rubber latex except as specifically authorized by GSA. The prohibition will apply to any physical movement of rubber or latex, whether placed in general order or in a foreign-trade zone, or whether entered for consumption, bonded customs custody, transportation, exportation, or otherwise.

Running Cold Oil

A novelty on the Texas Gulf Coast is this insulated field line, but it is necessary to handle a type of crude unusual to the area. The crude has a pour point of 82° F., and to keep it from congealing the 2-in. flow line is jacketed in a 4-in. pipe through which hot water is circulated, and the whole is encased in magnesia insulation. The well is a new wildcat, the Jake L. Hamon and Edwin L. Cox 1 Bessie T. Hughes, 3 miles north of the village of Chapel Hill in Washington County.

MEETINGS

Pipe Liners Meet

Contractors to convene January 9-10 at Houston

HOUSTON.—Pipe Line Contractors Association will hold its third annual convention here January 9-10 at the Shamrock Hotel. Registration and viewing of manufacturers' exhibits will take up the morning of January 9, according to Richard A. Gump, executive secretary.

Ray L. Smith, president of the association will deliver the opening address at the afternoon program, January 9. On this occasion J. L. Burke, president, Service Pipe Line Co., Tulsa, will speak on "Pipe Line Transportation." W. A. Saylor, chief metallurgist, Consolidated Western Steel Corp., Los Angeles, will discuss X-Ray Inspection of Weld and Plate Defects on Pipe." P. M. Mattison, tax manager, Price Waterhouse & Co., Houston, will speak on "Federal Income Tax Matters of Interest to Contractors."

Conferences will be conducted in the morning and afternoon of January 10. The banquet in the evening will be addressed by Charles A. Kothe, Tulsa attorney, on the subject of Public Relations.

The association has 36 contractor members (more than double the number of 3 years ago) and 55 associate members including equipment firms and sub contractors.

L.P.G. Growth

Industry registers big increase in sales percentage over 1949; future growth depends on defense program

BARTLESVILLE. — The liquefied petroleum gas industry in 1950 shook off a 1949 sales slowup and resumed a strong upward climb with a total sales volume 25.4 per cent over the 1949 mark and approximately triple the 1945 volume. The industry sold an estimated 3,333,000,000 gal. exclusive of any product used in the manufacture of aviation and motor gasoline and synthetic rubber.

In barely 25 years, the L.P.G. industry has grown from its infancy to a position wherein it now renders its services and products, directly or indirectly, to about two-thirds as many families as does the natural-gas industry, and to more than does the manufactured-gas industry.

Domestic use.—Estimated sales of L.P.G. for domestic purposes alone in 1950, 2,143,000,000 gal., were greater than the industry's total sales for all uses as recently as 1947, and were an increase of 31.7 per cent above domestic sales in 1949. At the end of 1950 there were about 7,500,000 L.P.G. installations on farms and in suburban areas.

K. W. RUGH

G. R. BENZ

This is the year-end review of the liquefied petroleum gas industry prepared by two officials of Phillips Petroleum Co., Bartlesville, Okla., K. W. Rugh, manager of the Philgas division, and G. R. Benz, manager of the chemical-engineering division.

Highlights

Total sales of L.P.G. in 1950 increased 25.4 per cent over 1949, in contrast with a 1949 gain of 5.9 per cent over 1948.

Domestic use increased 31.7 per cent over 1949. Total consumed was 2,143,000,000 gal. L.P.G. now used in 7,500,000 homes and farms not on gas mains.

Industrial uses gained 21.4 per cent.

L.P.G. used as a base material for manufacture of chemicals registered a 19.3 per cent jump over 1949.

Big increase in consumer interest noted in L.P.G. as fuel for internal-combustion engines.

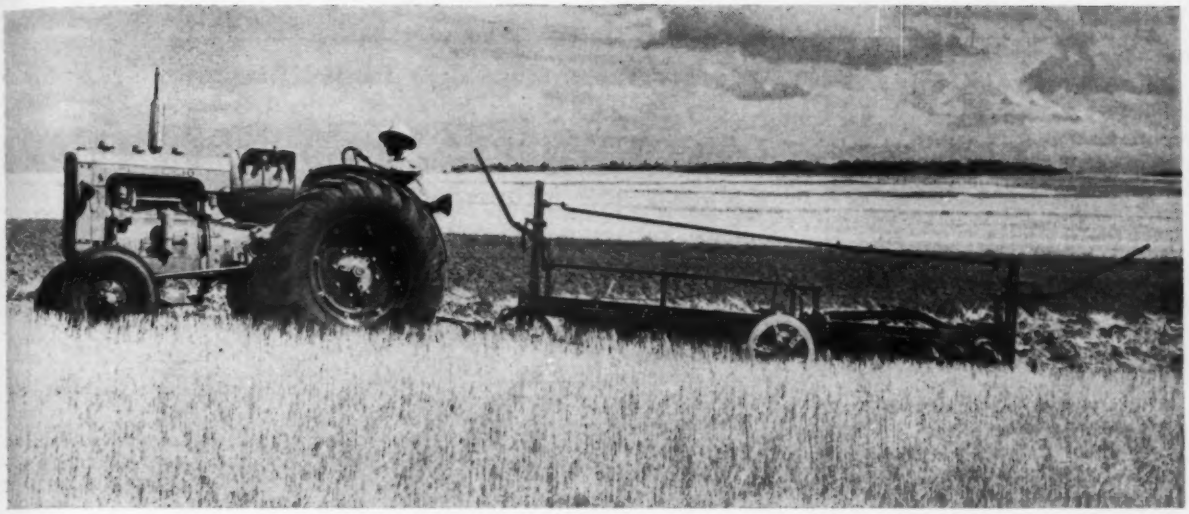
Approximately 713,000 of the gas ranges produced in 1950 were specifically made for use with L.P.G., and a great many of the remainder were adaptable with minor changes. An estimated 315,000 of the gas-fired, automatic water heaters went to L.P.G. users. The increasing use of L.P.G. for house heating is indicated by estimates that 20 per cent of all gas-fired direct-heating equipment and 12 per cent of the gas-fired floor

MARKETED PRODUCTION OF LIQUEFIED PETROLEUM GAS

Year	Total sales: Gal. (in thousands)	Total sales: Per cent increase	Distribution (thousands of gallons): Domestic*	Per cent increase	Industrial and miscellaneous†	Per cent increase	Gas manufacture	Per cent increase	Chemical manufacture	Per cent increase
1922	223	....								
1923	277	24.4								
1924	376	36.0								
1925	404	7.2	Sale of liquid petroleum gas confined primarily to bottled-gas business prior to 1928							
1926	465	15.2								
1927	1,091	134.6								
1928	4,523	314.6	2,600	....	400	....	1,500	....	.....	....
1929	9,931	119.6	5,900	126.9	1,500	275.0	2,500	66.7	.....	....
1930	18,017	81.4	11,800	100.0	2,200	46.7	4,000	60.0	.....	....
1931	28,770	59.7	15,295	29.6	7,172	226.0	6,303	57.6	.....	....
1932	34,115	18.6	16,244	6.2	8,167	13.9	9,703	53.9	.....	....
1933	38,931	14.1	16,626	2.3	13,987	71.3	8,318	—14.3	.....	....
1934	56,427	44.9	17,681	6.3	32,448	132.0	6,296	—24.3	.....	....
1935	76,855	36.2	21,380	20.9	47,894	47.6	7,581	20.4	.....	....
1936	106,652	38.8	30,014	40.4	67,267	40.4	9,371	23.6	.....	....
1937	141,400	32.6	40,823	36.0	62,610	(‡)	11,175	19.3	26,792	....
1938	165,201	16.8	57,832	41.7	62,694	0.0	12,386	10.8	32,299	20.5
1939	223,580	35.3	87,530	51.4	93,723	49.4	15,435	24.6	26,892	—16.7
1940	313,456	40.2	134,018	53.1	124,482	32.8	20,285	31.4	34,671	29.0
1941	462,852	47.7	220,722	64.7	172,669	38.6	25,255	24.5	44,206	27.5
1942	585,440	26.5	303,857	37.6	197,179	14.2	31,366	24.2	53,038	20.0
1943	675,233	15.3	344,962	13.6	237,396	20.4	37,519	19.6	55,356	4.4
1944	898,071	33.0	445,617	29.2	254,590	7.3	45,879	22.3	151,985	175.0
1945	1,067,979	19.0	533,262	19.7	258,577	0.8	53,849	17.4	224,291	47.5
1946	1,410,370	32.1	758,466	42.2	253,745	—1.1	86,660	61.0	311,499	38.8
1947	2,008,262	42.4	1,150,538	51.7	274,125	8.0	169,332	95.4	414,267	33.0
1948	2,511,160	25.0	1,473,289	28.1	275,883	0.6	237,638	40.3	524,350	26.6
1949	2,658,749	5.9	1,627,550	10.5	247,103	—10.4	239,210	0.6	544,886	3.9
1950	3,333,000	25.4	2,143,000	31.7	300,000	21.4	240,000	0.3	650,000	19.3

*Household use plus other requirements by these customers such as irrigation pumping, tractor fuel, flame weeding, chicken brooding, and similar uses. Included also is L.P.G. sold by domestic distributors but used for industrial purposes, internal-combustion engine fuel, and for gas manufacturing purposes. †Includes L.P.G. sold for fueling internal-combustion engines. ‡Not comparable due to segregation of chemical manufacturing.

Remarks: In this table total sales for all years except 1950 were obtained from U. S. Bureau of Mines reports. Distribution for the years 1931 to 1949, inclusive, was obtained from the same source. All other volumes were estimated by the writers. The total sales volume includes all L.P.G. (propane, butane, and propane-butane mixtures) when sold as such. Until 1944 the sale of pentane, when sold for any purpose other than motor-fuel blending, was included. Since then it has been excluded. It does not include butane when blended with heavier petroleum fractions for motor-gasoline purposes. Intercompany sales transactions such as purchases of L.P.G. by one company from other companies and resold as L.P.G. have been eliminated in order to avoid duplication of sales figures. The data do not reflect sales of L.P.G. used directly by the producer at the point of production for fuel polymerization, solvent dewaxing, etc. Neither do the figures include sales of hydrocarbons to plants manufacturing synthetic rubber, aviation gasoline, or their components.



L.P.G. FARMING.—Tractors like this one, factory-engineered and produced to burn L.P.G., are becoming popular with farmers due to superior performance and the increased availability of the fuel on farms.

furnaces were manufactured for L.P.G. Total retail value of equipment and appliances of all types sold for domestic use by the industry is judged to be about $330,000,000, and this figure does not include the retail value of gas itself sold for domestic use. By the end of December most L.P.G. distributors were faced with spotty shortages of appliances and equipment on one hand and a relatively strong consumer buyer's market on the other hand.

Marked acceleration of the important trend to the use of L.P.G. as fuel for farm tractors and irrigation pumping units was noted through 1950. This program has been stimulated by the increased availability of L.P.G. on farms, the economy and superior performance of tractors using this fuel, and the development of low-cost conversion equipment.

Approximately 100,000 L.P.G. conversion kits for farm tractors were sold in 1950, a figure equal to over 22 per cent of the total domestic shipments of wheel-type farm tractors made during the year. In addition many major tractor manufacturers are now offering tractors factory-engineered and produced to burn L.P.G.

A continuation of the trend toward bulk distribution of L.P.G. for space heating was apparent. The continued rapid growth of domestic use of L.P.G. was coupled with expansion of this phase of the industry's distribution system, and it is estimated that there are presently more than 4,000 L.P.G. bulk plants.

Industrial use.—The effects on industry of a generally high level of business activity throughout the year, as well as the effects of the military-preparedness program, were apparent in the increased use of L.P.G. by most industrial companies.

The largest percentage increase enjoyed by this phase of the L.P.G. industry since 1941 was registered this year with a resounding 21.4 per cent over the 1949 mark. Furthermore this increase took place in spite of the increased availability of natural gas to industrial plants in many areas. Sales were estimated at 300,000,000 gal.

Utilities.—Sales of L.P.G. for gas-manufacturing purposes are estimated at 240,000,000 gal. in 1950, approximately the same as in 1949. Relatively warm weather during the first 2 months of the year reduced appreciably the requirements of utilities using this fuel on a standby basis for peak load shaving or emergency conditions. In addition, completion of natural-gas lines to new areas and expansion of natural-gas facilities to areas already served continued. The unseasonable weather also affected L.P.G. sales to many of the 439 towns served by 288 utilities using L.P.G. as their sole source of supply. All of these factors, none of which can be regarded as having a permanent downward effect on the sale of L.P.G. to utilities, were sufficient to balance the increases due to normal expansion of existing facilities and conversion of a few plants from other fuels.

Chemical manufacture.—A new high was recorded in 1950 by sales of L.P.G. as base material for the manufacture of chemicals and chemical intermediates. Estimated sales totaled 650,000,000 gal., an increase of 19.3 per cent over sales in 1949. Chemical manufacture continued to be the second largest market for L.P.G. It is important to note that the large volume of L.P.G. used in the manufacture of synthetic rubber is excluded from this report. Among the more important chemicals manufactured from L.P.G. hydrocarbons are alcohols, detergents, plastics, resins, glycols, acetates, antioxidants, and special solvents.

The proximity of a source of L.P.G. has become a major factor in selecting the location of new chemical-manufacturing facilities. Rapid extension of natural-gas pipe lines into the Midwest and East has provided an excellent carrier for the light hydrocarbons.

Motor fuel.—Consumer interest in the use of L.P.G. as a fuel for internal-combustion engines increased tremendously in 1950. Of great significance to the industry is the fact that buses are now being factory-engineered and produced especially for L.P.G. with as high as 12 to 1 compression-ratio engines. One of the country's largest bus systems placed a single order for 500 new buses of this type in competition to bids offered by manufacturers of both diesel and gasoline-fueled buses.

Interest of truck fleet operators in L.P.G. was also much in evidence with many experimental conversions being made on all types of truck fleets ranging from the relatively small operator to large intercity freight lines. Taxicab fleets in many areas also evidenced much interest in L.P.G. as a fuel to solve their special operating problems. Continued satisfaction with L.P.G. as a fuel for heavy-duty mining equipment and off-highway construction machines resulted in gratifying increases in sales of the product in this field.

Future outlook.—Any discussion of industry trends must necessarily be qualified by the effects on them of the apparently imminent military preparedness program and of world conditions generally. To the extent that the L.P.G. industry fails to receive adequate supplies of steel for production, transportation, storage, and utilization facilities, it will be unable to fully satisfy the steadily increasing demand for its products and services.

Kansas Water Floods

Secondary recovery of oil by water flooding increasing in eastern Kansas; 159 new projects now in operation

Kenneth B. Barnes

TULSA.—Secondary recovery of oil by water flooding in eastern Kansas is increasing steadily, and during the past year accounted for 28,100 bbl. per day with 159 projects being in active operation.

This has just been disclosed in surveys made by the Kansas Corporation Commission and the Kansas Geological Survey, and reported to the Interstate Oil Compact Commission by A. E. Sweeney, Jr., director of the compact's secondary-recovery division.

The projects cover a total of about 22,500 acres, and 4,990 oil wells and 4,090 water-injection wells are involved in the total list of projects. Water injection per input well per day approximates 125 bbl. for the various operations, figured on an arithmetical basis.

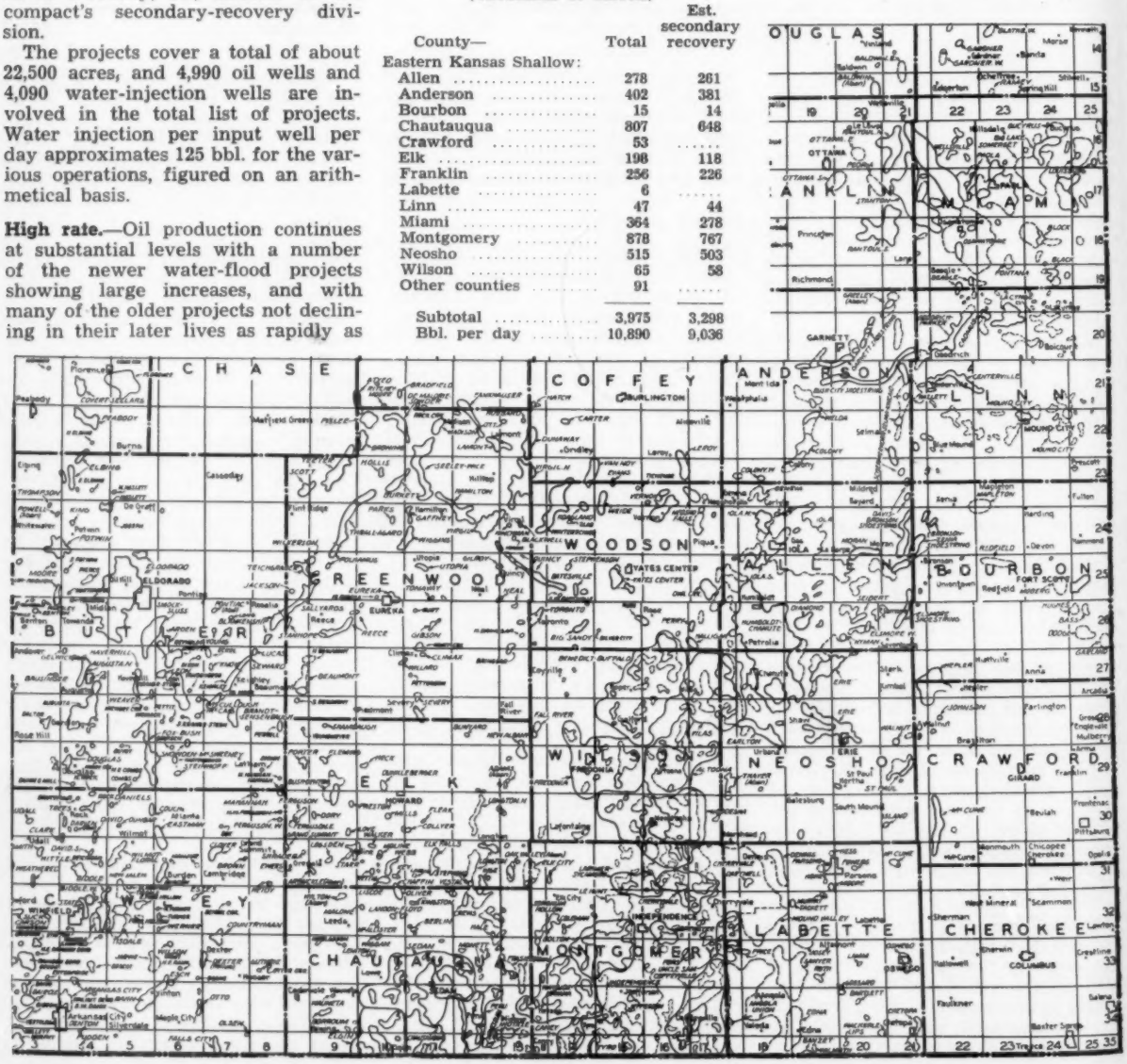
High rate.—Oil production continues at substantial levels with a number of the newer water-flood projects showing large increases, and with many of the older projects not declining in their later lives as rapidly as initially anticipated. Of the estimated secondary-recovery production of 28,100 bbl. per day for 1949, east-central Kansas contributed 19,060 bbl. and the eastern Kansas shallow area made 9,040 bbl. daily.

The accompanying tabulation in conjunction with map of the oil fields of eastern Kansas (see cut) indicates the regions of greatest oil-production activity by secondary recovery:

OIL PRODUCTION, 1949
(Thousands of barrels)

County—	Total	Est. secondary recovery
Eastern Kansas Shallow:		
Allen	278	261
Anderson	402	381
Bourbon	15	14
Chautauqua	807	648
Crawford	53	.....
Elk	198	118
Franklin	256	226
Labette	6	.....
Linn	47	44
Miami	364	278
Montgomery	878	767
Neosho	515	503
Wilson	65	58
Other counties	91	.....
Subtotal	3,975	3,298
Bbl. per day	10,890	9,036
Eastern Central Kansas:		
Butler	6,258	2,688
Chase	37	.....
Coffey	86	.....
Cowley	2,115	.....
Dickenson	202	.....
Greenwood	5,190	4,268
Lyon	424	.....
Marion	689	.....
Woodson	614	.....
Other counties	8	.....
Subtotal	15,623	6,956
Bbl. per day	42,803	19,058
Total both areas	19,598	10,254
Total both areas, bbl. per day	53,693	28,094

Gas repressuring now plays a minor role in eastern Kansas secondary recovery work, there being a total of only four projects, three in Cowley



Eastern Kansas oil area, which now contains 159 water-flood operations. (Map by E. C. Jacobson).

and one in Greenwood County. These cover a total of 3,990 acres.

Many operators.—From the standpoint of activity and production, the water-flood projects are about evenly divided between the larger companies and individual operators. Prominent among the former are Phillips Petroleum Co., Cities Service Oil Co., The Texas Co., Magnolia Petroleum Co., Sohio Petroleum Co., Sinclair Oil Co., Deep Rock Oil Corp., Ohio Oil Co., Kewanee Oil Co., Sunray Oil Co., and Skelly Oil Co. Most of the independent operators in this area are headquartered variously within the state at Chanute, Independence, and Coffeyville, and to the south at Bartlesville, Nowata, and Tulsa, Okla.

Engineering.—Almost all of the individual projects follow the five-spot development pattern. Well spacing from like well to like well varies but generally is from 330 to about 467 ft. in the shallower areas. In the rich 30-50-ft. Bartlesville sand (2,000 ft.) of the "Golden Lane" fields in Greenwood County, well spacing is 467 to 660 ft.

Pennsylvania sands. — Pennsylvanian age sands are the oil zones being water flooded in eastern Kansas, with the Bartlesville the most widespread and prominent. One of the deepest Bartlesville projects is in the Fox-Bush shoestring-stringer pool of south central Butler County, where 330 acres of 35-40 ft. sand is being flooded at 2,800 ft. by four operators. Some of these leases were "redrilled" for flooding, after having been plugged out for primary production. Fox-Bush is a southwestern continuation of the Golden Lane fields of Greenwood County, which comprise Sallyards, Thrall-Agard, Burkett, Seeley-Wick, De Malorie-Sowder, Hamilton, Fankhouser, and others where, as previously mentioned, the Bartlesville lies at about 2,000 ft. and where water-flood operations have been outstandingly successful over the past dozen years.

A number of deeper water-drive projects also are active in west-central Kansas, as for example, with Continental Oil Co. and Stanolind Oil & Gas Co. operating programs in the Hunton lime at 3,300 ft. in the Graber pool of McPherson County. However, the water-flood projects in eastern Kansas by far and large are in the shallow category, as the Bartlesville and other Pennsylvanian sands lying east of Cowley, Butler, and Greenwood counties are in the general depth range of 350 to about 1,400 ft.

Project Sold for $1,550,000

CHANUTE, Kans.—A $1,550,000 lease sale was recently announced here which involves one of the largest sets of water-flood leases in eastern Kansas. Under the deal the Skiles Oil Corp. of Mount Carmel, Ill., acquired the 1,160-acres of developed water-flood oil properties of Lynde, Walter & Darby, which lie east of Chanute. Officials said additional wells will be opened on the tract and more acreage will be acquired. The property is regarded as a model water-flood oil operation in the Mid-Continent area.

Skiles operates in several midwestern states. The purchase of the Chanute field properties represents the company's first venture into the Kansas area.

This Lynde, Walter & Darby water-flood operation was described in detail in the Journal issue of June 29, pp. 60 et seq., and other eastern Kansas water-flood projects also were detailed in the Journal's issues of July 6, 1950, p. 46, July 13, 1950, p. 82, and July 20, 1950, p. 91.

SOUTHWEST

Drilling Approved

Oil, gas to be sought at Shreveport Air Force base

SHREVEPORT.—Local opponents to the drilling of Barksdale Air Force Base for oil or gas apparently have lost their fight, it was learned this week.

Floyd R. Hodges, Jr., chairman of a committee of Shreveport and Bossier City citizens expressed this opinion here after a conference held recently in Washington with Oscar Chapman, secretary of the interior.

Hodges expects the Government to advertise for bids covering the leasing of a part of the base for drilling.

The committee chairman said that the Government had agreed to compensate the city of Shreveport for money expended in originally securing the base for the Air Force. The city is reported to have spent $3,000,000 towards acquisition of the base.

Hearing held.—Last August the cause of the committee appeared lost when Harold C. Stuart, assistant secretary of air, wrote the Department of the Interior approving drilling for oil and gas on a part of Barksdale field if the Interior Department also approved it. Stuart had presided at a public hearing held in Shreveport in September 1949 on the proposal of drilling a part of the base. Chief argument of the Government at the time for drilling a part of the base was to protect it from drainage occurring in the adjoining Sligo field.

The citizens' committee countered that drainage had been occurring over a period of 20 years and declared that no objection had been raised in the past. The committee also stated that derricks over eight wells producing on the land when it was donated to the Government were dismantled and the wells plugged due to the menace to flying.

Following the issuance of the letter from Stuart to Chapman, the local committee sought an audience with President Harry S. Truman but the matter was referred to Chapman.

Reef Holds Large Reserves

AUSTIN.—A reserve of more than one trillion cubic feet of gas associated with oil lies in the reef formations on the east side of the Permian basin, according to a report filed here with the Texas Railroad Commission by Paul J. Kayser, Houston, president of El Paso Natural Gas Co. Bulk of the reserve lies in Scurry, Kent, Howard, and Borden counties.

In an appearance before the commission in which he lauded the regulatory body's decision to retain the present gas-oil-ratio-limits rule, Kayser revealed plans of El Paso Natural for expansion of its facilities to handle this large volume of gas.

Kayser's report showed that residue gas contributed 83.11 per cent of the total volume gathered by his firm during 1949. In 1940 this percentage amounted to only 5.49. The El Paso official said that his firm will gather 646,000 M.c.f. daily.

Gas Properties Purchased

A newly organized company, made up of a group of western industrialists, has purchased 95,000 acres of proven gas reserves in the Oklahoma Panhandle and 20,000 adjoining acres in Kansas, for a consideration of $36,000,000.

The corporation, known as Hugoton Plains Gas & Oil Co., will take over and produce and develop the properties, which have reserves estimated at more than 800 billion cubic feet. The three principal stockholders are J. Simon Fluor, Los Angeles plant designer and builder for the petroleum, chemical, and power industries; William R. Staats Co., Los Angeles investment banking firm; and Fred R. Tuerk, director and executive officer of several Midwest industrial firms.

Gas produced on the properties is under long-term contract to Northern Natural Gas Co. There are more than 150 completed producing gas wells and a natural-gasoline plant is now under construction at Hooker, Okla., which will handle 110,000,000 cu. ft. of gas daily.

Taxpayers' Strike Ended

GLADEWATER, Tex.—A taxpayers' strike against the city of Gladewater which began in November 1949 when the city annexed a 2,000-acre tract of oil-producing land worth $15,000,000, ended last week. Seven major oil companies paid taxes they

had withheld since November 1949 in protest against the annexation. About $70,000 has been paid in by Humble Oil & Refining Co., The Texas Co., Tide Water Associated Oil Co., Magnolia Petroleum Co., Stanolind Oil & Gas Co., Shell Oil Co., and Cities Service Oil Co. cancelling delinquent-tax debts which had accrued since last summer, according to Mayor Carl Bruce of Gladewater. However, more than $40,000 in delinquent taxes remain outstanding mostly from independent oil operators who joined the taxpayers' strike and who have not yet paid, Bruce said.

The strike began when the city extended its boundaries eastward to bring into the city limits a large tract of land on which are located 171 East Texas oil-field wells. The tax fight entered the courts when T. M. Armstrong, owner of 168 acres of the disputed property, filed suit in the 124th District Court attacking legality of annexation. Judge Fred Erisman ruled December 18 that the annexation was legal although Armstrong indicated he would appeal the decision. The oil companies and independent operators halted their strike and agreed to pay.

New Gasoline Plant

Shell starts operation of Provident City facilities

HOUSTON. — Full-scale operation started this week at the new 60,000 M.c.f. gasoline plant of the Shell Oil Co. at Provident City, Tex., Joe T. Dickerson, Shell's area manager has announced.

Although the plant was completed in June 1950, it has been operating at only 20 per cent of capacity while awaiting construction of a 110-mile 16-in. pipe line for Texas Eastern Transmission Corp. which will carry gas from the plant to Baytown, Tex. Following a lengthy delay due to pipe shortages, the line has been completed and is now undergoing final tests preliminary to full operation.

The new plant is located at a central point in the Provident City field and represents an important step in the company's gas-conservation program. It will process gas also from the Englehart field about 2 miles to the east and from the Brushy Creek and Hope fields, situated about 21 miles west.

Residue gas. — Designed to process 60,000 M.c.f. of gas per day, the plant will furnish approximately 50,000 M.c.f. of residue gas per day which will be dehydrated and sold to Texas Eastern. In addition, about 2,500 bbl. of propane, natural gasoline, and distillate will be recovered by high-pressure absorption from the wet gas. The propane will be shipped to railroad tank-car-loading facilities at Sheridan, Tex., and the natural gasoline and distillate will be carried by pipe line to the Shell refinery at Houston.

Plant facilities.—In addition to processing equipment, the new facilities feature steam boilers capable of delivering 26,000 lb. per hour of steam at 300 psig., electric generations producing 750 kw. per hour, a laboratory, an office building, shops, warehouse, and a 12-house camp for key plant personnel.

George Bertram, the company's district gas-plant superintendent, has general supervision over the plant, while Ralph W. Rabb, assistant superintendent, is in immediate charge.

Towers in the absorption and distillation area of the new Provident City, Tex., natural-gasoline plant of Shell Oil Co., which will deliver approximately 50,000 M.c.f. of dehydrated residue gas to Texas Eastern Transmission Corp. The plant was completed in June 1950, but has just started full-scale operation.

Index Ready Soon

The complete editorial index of The Oil and Gas Journal for 1950 is now in preparation and will soon be ready. The complete index, enlarged and improved and with more cross-references, bound separately, will be sent without charge to all subscribers requesting a copy. Address requests to Circulation Department, P.O. Box 1260, Tulsa.

Crude Line Planned

Five firms to build West Texas-Gulf Coast artery

HOUSTON.—A large new crude-oil pipe line from West Texas to the Gulf Coast will be built next year by five major companies if the Petroleum Administration for Defense approves plans filed with it by Gulf Oil Corp.

The line will originate in Colorado City, Mitchell County, and run 440 miles to Sour Lake, Hardin County. Its diameter will be 26 in. from Colorado City to Wortham, Freestone County, and 24 in. from Wortham to Sour Lake. Total capacity from West Texas to the Gulf Coast will be 300,000 bbl. per day.

From Wortham another line is planned, as a separate project, to connect at Longview, in East Texas, with the Mid-Valley crude line operated jointly by Sun Oil Co. and Standard Oil Co. (Ohio) to Lima, Ohio.

Gulf, owner of more than 50 per cent of the new project, will be the builder and operator. Other participants will be Sun, Sohio, Pure Oil Co., and Cities Service Oil Co.

To start soon.—It is planned to start construction in the late summer or early fall of 1951 and to have the line completed by the middle of 1952. Right-of-way already has been obtained.

The line is designed to provide a much-needed outlet for crude from Scurry County and other West Texas fields, and to serve refineries in the Houston-Beaumont area. The spur to Longview will assist the Mid-Valley line in transporting crude to Ohio refineries. At present Gulf is delivering in excess of 32,000 bbl. daily of West Texas crude to Mid-Valley via its own lines. Construction of the new line will permit Sun to move its own West Texas crude into the Mid-Valley system. Sun already has a 6-in. line from Jamison pool in Coke County to Colorado City.

Construction of this line will provide an outlet for much crude from various West Texas fields which have been sharply prorated in recent months.

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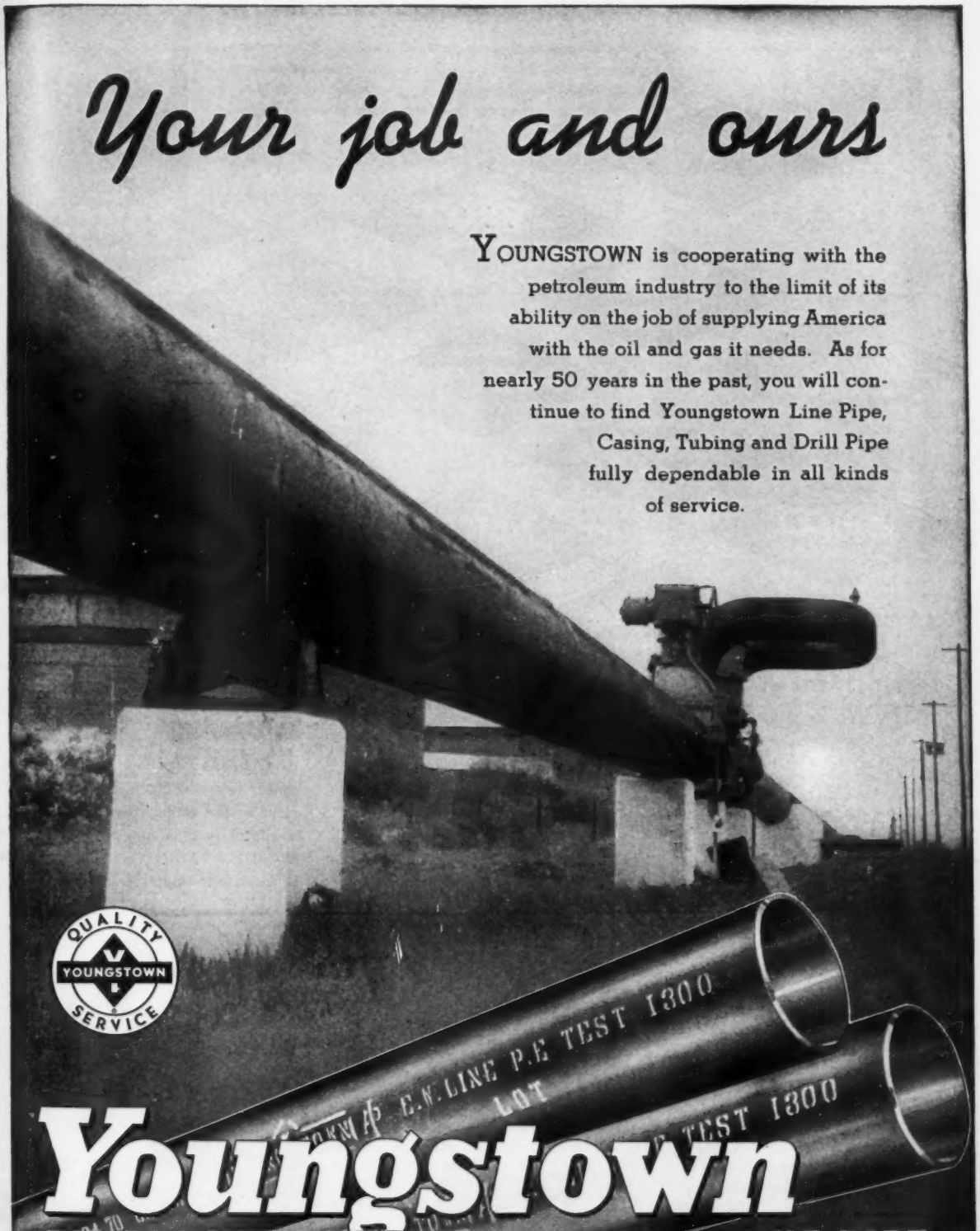

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LATIN AMERICA

Concession Agreement

I.P.C. will serve as advisor in operation of Colombia's De Mares concession; takes 10-year lease on refinery

Dahl M. Duff

INTERNATIONAL PETROLEUM CO., LTD., and the Colombian Government have reached an agreement under which International will serve as adviser in the operation of the De Mares concession and take a 10-year lease on the refinery at Barranca Bermeja when these properties revert to the government on August 25, 1951.

The arrangement between the company and the government culminates the protracted discussions which have been taking place within the Colombian Government for several years on the question of how to operate the Tropical Oil Co. concession when it expires.

The government will organize an official company, Empresa Nacional de Petroleos, to take over the concession on behalf of the government. The two memorandums of agreement which International has signed with the minister of petroleum give in detail the terms under which the company will assist with the production and continue to operate the refinery.

Operated 30 years. — The De Mares concession has been operated for 30 years by Tropical, a subsidiary of International. The fields, refinery, and all fixed equipment become property of the government when the concession term runs out. De Mares is the first important instance of reversion of an oil concession to a government through the normal expiration of its term.

There has been considerable speculation over what part International, an affiliate of Standard Oil Co. (N. J.) would take in the concession operation after it passed to the government. Tropical has been the dominant marketer in Colombia, and its nonconcession distributing outlets are unaffected by the concession termination.

Properties transferred. — Earlier this year, International transferred these marketing properties to a new company, Esso Colombian. The new agreement with the government provides that International will offer publicly in Colombia up to 40 per cent of the shares in this new company. After next August, Tropical's activities thus will be confined to whatever exploratory operations it may carry on elsewhere in the country.

Under provisions of one of the memorandums, International's position in connection with the De Mares producing operations after reversion will be that of a technical consultant. Without responsibility for results, it will recommend location of new wells in the existing fields and in the Galan structure in the Magdalena River bed, give technical advice on secondary recovery, assist in organizing the accounting department controls system, and aid in placing orders for materials.

Company's fee.—For this work, the company will be paid a fee either in Colombia currency or in crude oil for export. This will be 4 per cent of production the first year, 3 per cent the second, and 2½ per cent the third. This arrangement runs for 5 years and can be terminated after 3 years by the Empresa, but not International, upon 6 months' notice.

During the first 2 years, International cannot, without consent of the government company, reduce present foreign personnel in De Mares. All expenses of the foreign personnel are paid by International. Production, equipment, and other labor costs are met by the Empresa. The manager will be appointed by the Empresa with International's agreement. The services International will perform deal only with the producing area, and any exploration the Empresa may undertake on the approximately 1,200,000 acres of nonproducing land in the concession is not covered. During the term of International's consultant contract, Colombians will be trained to take over the operations.

Refining operations. — The over-all agreement in regard to the Baranca refinery, now a 23,000 bbl. daily capacity skimming and lubricating-oil plant, from which Tropical has met a large part of Colombia's domestic requirements, provides that the company will lend up to $10,000,000 for a modernization program, including the installation of a cracking unit.

Production of crude, natural gasoline, and gas will be sold preferentially by the government company to International. After the new cracking unit is placed in operation, the government will receive 18 centavos (9 cents) per barrel processed. After this per barrel payment is made, the government will receive 75 per cent of the profits from the refinery operation. Prior to completion of the cracking unit, the per barrel payment will be 7 centavos.

International will meet all expenses of the refinery operation and charge them to the operating account. The government company is required to set up a reserve for depreciation and new capital investment. The crude will be bought from the Empresa and the products sold from the refinery on the basis of prevailing United States prices, but it is stipulated that in setting the crude price, the difference between this price and the average of the refined products may not be less than 60 per cent of the crude, or in no case less than 75 cents a barrel. Another provision guarantees Esso Colombiana an opportunity to make a reasonable profit on its retail marketing under government price controls.

Refinery loan.—The loan to be made for the improvement of the refinery will be repaid by the Empresa, beginning with the time the cracking unit is placed in operation. Repayment, with 4 per cent interest, will be in equal semiannual installments over 10 years, the period of the refinery lease. The engineering firm to carry out the refinery program will be selected by agreement, and the Empresa will repay in dollars and in pesos the parts of the loan made in these currencies.

The arrangements between the government and International apparently assures the company of a domestic source of supply to carry on its marketing operations. Although International a year ago said it would not participate in the concession after reversion, some agreement in respect to its continued operation had been anticipated.

The cracking unit and improvement of the Barranca refinery is a project which has long been sought by Colombian officials. Various recommendations have been made in the past for improvement of the country's transportation and refining system. A substantial part of the total requirements of Colombia is imported, amounting in 1949 to about 1,500,000 bbl. of the total of some 7,000,000 bbl. domestic demand. Gasoline, 41 per cent met by imports, has been in recurrent short supply in Bogota, but this is in large part due to the difficulties with the present rail transportation.

Concession area.—The De Mares concession covers an area of about 1,280,000 acres stretching 70 miles along the Magdalena River for an average depth of 30 miles. First granted in 1906, it was purchased by the Benedum-Trees interests in 1916. The discovery was made in 1918, and 2 years later, the operating company, Tropical, was sold to International. There was a dispute as to when the 30-year concession term actually began, but

the date was finally fixed as August 21, 1921.

Late in 1948, the Colombian Congress, then meeting, passed a law authorizing a government company to take over the properties on reversion. Majority control was to be in the hands of the government or Colombian nationals. Later negotiations were carried on with a group of Colombian industrialists who proposed a company in which they would have 55 per cent control and the government 45 per cent.

Four fields. — De Mares, Colombia's major source of production, has four fields which are now producing approximately 37,000 bbl. daily. Cumulative production to the middle of this year was about 397,000,000 bbl. Remaining reserves have been estimated at about 125,000,000 bbl., and more with secondary recovery.

Under the International consultant contract, the labor and squatter troubles which have been a problem in the past will be a matter for the government. In 1948, many of the poorer class of Colombians moved into the concession area on the strength of wild reports they might get an oil well when the properties were turned over to the republic. Many of them are still in the concession, creating a safety hazard and economic problem.

MIDDLE EAST

New Aramco Tax

20 per cent levy on net income of Arabian American Oil decreed by Arabian Government effective October 13

A 20 PER CENT TAX on the net income of Arabian American Oil Co. has been decreed by the Saudi Arabian Government.

The decree was issued October 13 and the tax presumably is effective as of that date. According to reports from Cairo, the company has taken exception to the levy in view of the fact that its concession agreement exempts it from taxes.

George Ray, chief counsel for the company, and other Aramco officials who are in Jedda, Saudi Arabia, are reported to be discussing the matter with the government in an effort to work out a settlement.

At the same time, the government decreed a 5 per cent income tax on all personal income above $5,000 a year. This tax will affect practically all the supervisory and technical personnel of Aramco who are stationed in Saudi Arabia.

At the present time, Americans working in Saudi Arabia and other foreign countries are exempt from the United States personal income tax provided they are out of the country for the full calendar year. Some employes out of the country only part of the year will be subject to both United States and Saudi Arabian taxes, and presumably Aramco, like various other foreign operating companies, will assume the foreign income tax in these cases.

Contract cited.—In connection with the company profits tax, Aramco was understood to be calling the government's attention to the terms of the concession contract. This, like various other differences that have arisen in the past, is expected to be worked out eventually. Most of the concession agreements in the Middle East stipulate some sort of fixed payment in lieu of taxes on the operations.

Aramco now pays a royalty equivalent to about 31 cents in United States money. With production this year anticipated at about 200,000,000 bbl. total, this means a royalty income at present of some $62,000,000 to the Saudi Arabian Government.

Iranian development. — Another development occurring last week in Iran also reflected efforts of Middle East governments to obtain still more revenue from the oil companies holding producing concessions.

A year and a half ago, Anglo-Iranian Oil Co., Ltd., agreed to a revision of its 1933 concession agreement under which the royalty rate would be doubled and other changes made in favor of the country. Basic royalty was to be increased from 4 to 6 shillings a ton, and total payments would have been brought to the equivalent of about 33 cents a barrel.

The troubled political situation in Iran caused the government last week to withdraw from parliament the bill to ratify the concession revision. There had been strong opposition in the parliament from deputies who contended the government should have obtained still more from the company.

The government's finance minister said the bill was withdrawn because the debate plainly indicated it would be rejected. New negotiations with the company, in which the government hopes to get still better terms, are to commence in the near future.

Rights unprotected. — Withdrawal of the bill followed a report by a parliamentary committee that the supplemental agreement "failed to protect sufficiently Iran's rights." After this action, the Manchester Guardian, influential British newspaper, commented editorially that Iranian politics were driven by "so many wheels within wheels" that it was difficult to say what were the real motives behind the failure to approve the agreement.

Agreement Reached

Arabian American Oil Co. and the Saudi Arabian Government have reached an agreement providing for a 50-50 per cent split of the company's net operating profits.

The agreement is along the lines of the policy of the Venezuelan Government which has adjusted its income taxes to take about half of the oil-company profits in that country.

Under the agreement between Aramco and Saudi Arabia the company will continue to pay the royalty amounting to the equivalent of about 34 cents a barrel. The net profit of the company to be split with the Government is that resulting after payment of United States taxes and other expenses, including royalty.

The agreement was reached recently after negotiations in Jedda, Saudi Arabian capital, and awaits the formal ratification of the Aramco board. The development makes the Saudi Arabian oil income highest of any of the producing operations in the Middle East, and is considered certain to have repercussions in other Middle East countries.

EUROPE

Hungarian Oiler Reported

Incomplete reports indicate an oil discovery of possible importance has been made about 100 miles east of Budapest in Communist-controlled Hungary.

The area was identified as at Biharnagybajom on the eastern part of the Hungarian plain and not far from the Romanian border. Apparently several wells have alredy been brought in, and it was said that Russian officials have recently visited the area in order to speed up its development.

There has been no oil production in this region heretofore. Some drilling was carried out during the war by the Germans and others on both sides of the border. Across the border in Romania but in a separate basin are the gas fields of Transylvania. Romania's oil production is on the other side of the Carpathians. Hungary's present known production is from the Lispe in the southwest part of the country.

(Other news will be found on pages 113 and 125 of this issue.)

PERSONALS

Joins Salt Dome

H. S. McQueen is named executive vice president

H. S. McQUEEN, chief geologist and manager of the Houston oil and gas division of Aluminum Co. of America, has joined Salt Dome Production Co. as executive vice president and chief geologist, effective January 1.

A graduate of University of Missouri, McQueen served as assistant state geologist of the Missouri Geological Survey at Rolla, in addition to being an assistant director of the survey.

In 1943 he joined Alcoa Exploration Co. at New York as chief geologist and vice president. He was transferred to Houston in 1948 as manager of the oil and gas division and retained his title of chief geologist.

McQueen assisted in making plans and surveys on the Alcoa's aluminum-reduction plant at Point Comfort, Tex., and worked on the project while it was under construction, and since then, he has directed the program of development of natural-gas reserves for the plant.

Author of a number of books and articles on geological subjects, McQueen is a member of the American Association of Petroleum Geologists, the Geological Society of America, the American Institute of Mining and Metallurgical Engineers, and the New York Academy of Sciences.

Charles E. Davis, field geologist for Gulf Oil Corp. at Crane, Tex., has been transferred to Fort Worth.

John G. Raymond, formerly with Paul Weir Co., Chicago, has joined Pure Oil Co. at Terre Haute, Ind., as exploration geologist for the State of Indiana.

L. L. Davis, head of Karda Oil & Gas Co., has opened offices for the firm in Denver. Davis, who is from Chicago, has been active in Wyoming drilling during the past year.

F. B. Jensen, superintendent of the southern district pipe lines for Shell Oil Co., has been named superintendent of the northern district pipe lines with headquarters at Corral, Calif., succeeding **E. W. Jenkins,** who has retired after 35 years with Shell. Jensen started with Shell in 1926 as a rodman and after gaining wide experience in pipe-line operations, was appointed superintendent of the southern district pipe lines in 1947, from which position he moves to Corral. **H. H. McQueen** will succeed Jensen as superintendent of the southern district pipe line with headquarters at Los Angeles. McQueen joined Shell in 1926 as a draftsman, was made mechanical engineer in Los Angeles in 1944, the position he has held until the present time.

R. L. MINCKLER

Robert L. Minckler, president of General Petroleum Corp., has been elected president of the Western Oil and Gas Association, succeeding **Reese H. Taylor,** president of Union Oil Co. of California, who had served as president for the past 2 years. Minckler joined General Petroleum in 1924 as an accountant, was named assistant to the president in 1934, and elected a director of the company in 1941. During World War II he served as director of petroleum supply in the Petroleum Administration for War in Washington, D. C., returning to General Petroleum in 1945 as vice president. He became president in 1948. Other officers elected by the board of directors for the Western Oil and Gas Association include: **William Reinhardt,** vice president, Union Pacific Railroad Co., first vice president; **William F. Humphrey,** president, Tide Water Associated Oil Co., second vice president; **L. K. Whittier,** vice president, Belridge Oil Co., treasurer; **John M. Pierce,** vice president and general manager, and **D. S. Kilgour,** secretary.

Bill Cordell, formerly district manager at Shreveport, La., for Sohio Petroleum Co., has joined **Dan Kralis** at Abilene, Tex., in formation of a new consulting geological firm.

Harold P. Stewart, gas-test engineer for Stanolind Oil & Gas Co. at Houston, has been transferred to the North Cowden gasoline plant near Odessa, Tex., in the same capacity.

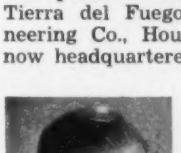
James G. Adkins, Adkins Drilling Co., Great Bend, Kans., has been elected chairman of the Kansas chapter, American Association of Drilling Contractors, succeeding **Charles H. Todd,** Rine Drilling Co., Wichita.

H. HOOVER, JR.

Herbert Hoover, Jr., president and general manager of United Geophysical Co. and United Geophysical Co., S.A., has been elected to the board of directors of Union Oil Co. of California. Hoover fills the vacancy caused by the death of Ernest Stauffen, who had been a member of Union's board for 6 years. Hoover, who organized United Geophysical Co., will continue as the active manager.

Kenneth Huffman, district engineer in Sohio Petroleum Co.'s Owensboro, Ky., office, has resigned, and will do consulting engineering work, specializing in water-flood studies and operations at Owensboro. He has been engaged in water-flood engineering and operations for the past 3 years, and has been with the firm for 7 years.

Juan Pedrals Gili, mining engineer; **Emilio Wilckens,** chemical engineer; and **Guillermo Cabrera,** mechanical engineer, all with Corporacion de Fomento, Chile, are in the United States undergoing training preparatory to operating Chile's first natural-gasoline plant which is being built in Tierra del Fuego by Hudson Engineering Co., Houston. All three are now headquartered at Olean, N. Y.



John D. Gill, director and economist of Atlantic Refining Co., Philadelphia, has retired, as of January 1. He joined the company in 1912 as a lubrication research engineer in the laboratory department and served as a director of the control laboratory at the old refinery in Pittsburgh during 1914-15. He was then transferred to Philadelphia and made manager of the sales personnel and organization department, which

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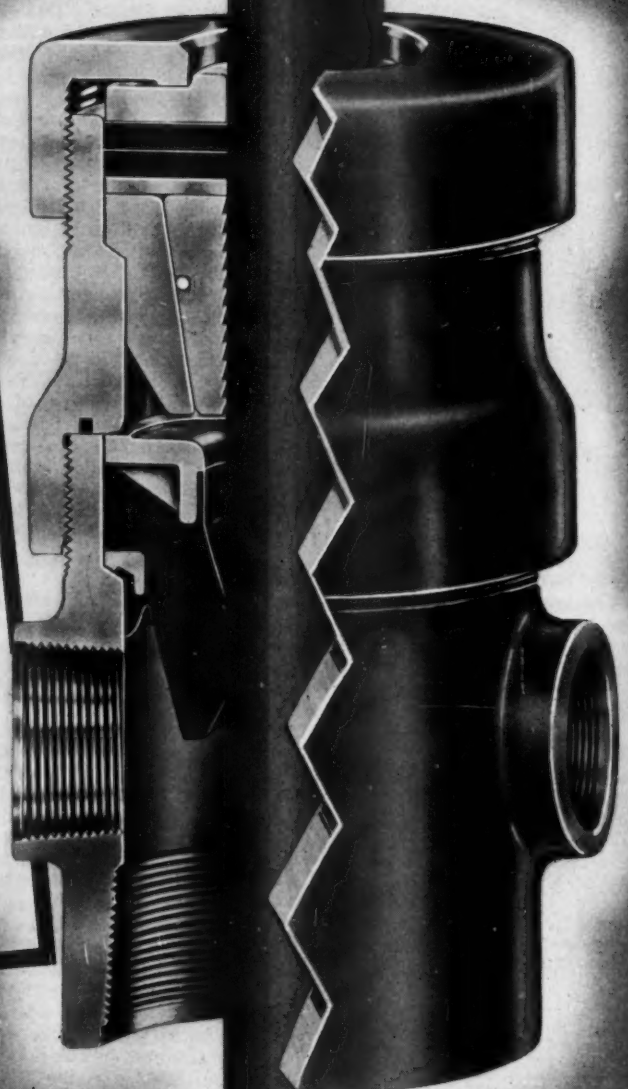

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PERSONALS

he headed until 1928, when he was appointed to head the economics department. He was elected to the board of directors of the company in 1931, and has served continuously on the board since that time.

ROGERS

HORSLEY

William G. Rogers has been elected executive vice president of East Ohio Gas Co., Cleveland, by the board of directors. He joined the firm as an engineer, was named assistant secretary in 1932, secretary and treasurer 1 year later, and vice president in 1939. He graduated from Case Institute of Technology in 1915 with a civil-engineering degree. Vice presidents elected were: **George W. Horsley, Robert W. Ramsdell,** and **John H. Carson.** Horsley, who joined the firm in 1915 after receiving his degree of bachelor of science in electrical engineering at Case, has been general manager since 1949. Ramsdell, who

CARSON

RAMSDELL

joined the firm in 1928 after graduation from Case, was manager of the Youngstown division from 1934 until 1944, when he was transferred to Cleveland as assistant general superintendent. He was named general superintendent in 1949. Carson joined the company after receiving his master of science degree from Case, and has served as assistant chemist, assistant chief engineer, purchasing agent, and chief engineer.

Comdr. W. G. Greenman, who was in charge of Naval Petroleum Reserves for several years, is retiring from the U. S. Navy on January 31. He has accepted an appointment as director of a boys' school at Deep Springs, Calif., effective in February.

G. L. Yates, Amstutz & Yates consulting firm, was elected chairman of the Kansas chapter of the American Institute of Mining and Metallurgical Engineers at the annual meeting in Wichita. Other officers elected include: **T. J. Hamilton,** National Cooperative Refinery Association, vice chairman for Wichita; **L. W. Holsapple,** Sinclair Oil & Gas Co. at Augusta, Kans., vice chairman for eastern Kansas; **John C. Gallivan,** Wood River Oil & Refining Co., Great Bend, vice chairman for western Kansas; **George J. Decker,** Schlumberger Well Surveying Corp., secretary-treasurer; and **E. L. Anders,** of Kansas University, and **J. R. Berg,** of Wichita University, directors.

Robert Wittwer, petroleum engineer for Carter Oil Co. at Oklahoma City, has been transferred to Purcell, Okla., in the same capacity.

Carl J. Ray, Jr., petroleum engineer for The Texas Co. at Crane, Tex., has been transferred to Midland, Tex., as reservoir engineer.

Earl M. Burch, formerly with El Dorado Refining Co. in Wichita, has joined the geological staff of National Cooperative Refinery Association in Wichita.

Everette Lee DeGolyer, Dallas oil man and geophysicist graduate from University of Oklahoma, has been named to the scientific manpower committee which guides the National Security Resources Board and the president in the use of scientists, engineers, and other technical personnel in the defense mobilization.

Clarence A. Withey has been appointed general shift foreman at Esso Standard Oil Co.'s Baltimore refinery.

A. H. McHarg, The California Co., New Orleans, has been named assistant to the president, succeeding **C. C. Loveless, Jr.,** who has resigned to join the New Mexico Oil and Gas Association at Roswell, N. M., as executive secretary.

J. W. Looney, The California Co., production department, western division, Denver, has been transferred to the Gulf Coast division, Harvey, La. Other changes in the firm include: **R. L. Manley,** exploration department, western division, from Denver to Grand Junction, Colo.; **J. D. Nance,** exploration department, southern division, New Orleans, to western division, Casper, Wyo.; **N. M. Goodwin,** production department, western division, Rangely, Colo., to Lake St. John, La.; **H. R. Dannemann,** exploration department, New Orleans, to western division, Denver; **H. W. Carlson,** exploration department, southern division, Shreveport, to geophysics division, New Orleans; **J. W. Breazeale, Jr.,** production department, western division, Quealy dome, to Borie field, Wyoming; and **G. E. Jones,** exploration department, western division, Denver, to New Orleans.

B. G. Martin has been named executive assistant and exploitation advisor of the Houston production division of Gulf Oil Corp. and Gulf Refining Co.

Edward L. Stauffacher, of Chicago, vice president of Cities Service Oil Co. of Delaware, has been appointed district chairman of the Great Lakes Oil Industry Information Committee.

W. F. BATES

W. F. Bates has been appointed general drilling superintendent of Shell Oil Co., succeeding **C. S. Penfield,** who is retiring after more than 35 years with Shell. Bates was graduated from Stanford University in 1933 in engineering, and joined the company soon afterwards as a roustabout. Two years ago Shell announced the successful completion of a deep-well portable drilling rig. Bates was in charge of the project. He has had wide experience in all phases of oilfield operations, specializing during the past few years in drilling.

Vernon Hess, formerly with Cities Service Oil Co., has entered the private consulting field in Kansas.

Grover E. Murray, professor of geology at Louisiana State University, has been appointed chairman of the department of geology.

A. W. Cullen, formerly with Continental Oil Co. and Lion Oil Co., has been named manager of the new exploration office for the Rocky Mountain area for British-American Oil Producing Co. at Denver.

E. H. Counts, formerly chief chemist at Sinclair Oil & Gas Co.'s research laboratory at Seminole, Okla., has been transferred to Tulsa as assistant superintendent of plant operations. Counts has been with the firm for the past 17 years.

Oscar John Dorwin, general counsel of The Texas Co., has been reelected chairman of the American Petroleum Industries Committee for the coming

PERSONALS

year. On the committee's staff, **John H. Bivins,** formerly assistant director, has been appointed to the newly created post of associate director, **Adam J. Rumoshosky** was made assistant to the director, **Baird H. Markham;** and **Stephen P. Potter,** manager of the publicity section. **Cyrus S. Gentry,** Shell Oil Co.'s vice president and general counsel, was reelected secretary.

A. G. MAY

Arthur G. May, veteran official of Standard-Vacuum Oil Co., who previously has been associated with marketing in the Far East, has been named secretary of the company. He succeeds **Harry H. Pethick** who is retiring after 31 years with the company which he has served in China, Indo-China, and New York.

Castle J. Harvey has been named manager of Deep Rock Oil Corp.'s geophysical department. He was formerly with Atlantic Refining Co. as geophysical coordinator at Tulsa, and later geophysical supervisor for Oklahoma and Kansas.

Warren C. Wilson, Esso Standard Oil Co., has been named assistant process superintendent at the Bayway, N. J., refinery. He is succeeded by **William J. Wiseman,** who was promoted from head of the operations analysis department to head of the Bayway distillation and cracking division of the process department. **C. Russell Haag,** who formerly headed the Bayonne, N. J., operations analysis department, moves to the same position at Bayway.

Thomas J. Bevan, formerly a partner in Mayes-Bevan Co., has opened offices in Tulsa as a consulting geophysicist specializing in the interpretation of gravity information and its integration with other geophysical and geological data. A graduate of University of Chicago, Bevan was formerly with Magnolia Petroleum Co. in charge of gravity interpretation.

William H. Bowersox, chief inspector for Texas Illinois Natural Gas Pipeline Co., has been transferred from Wharton to Carthage, Tex.

W. C. MacQuown, Jr., will head the new Deep Rock Oil Corp. office in Denver, and **Kenneth Webb,** formerly geologist in Deep Rock's Wichita offices, has been transferred to the new office in Sterling, Colo.

Robert R. McDaniel, formerly senior engineer with Sohio's Products Pipe Line Division, has been appointed division engineer at Fostoria, Ohio.

Jack L. Mataya, seismograph party chief at Concordia, Kans., for Stanolind Oil & Gas Co., has been transferred to Big Spring, Tex., as field seismograph supervisor.

Paul Johnson, party chief for Continental Oil Co. at Roundup, Mont., has been transferred to Aztec, N. M., in the same capacity.

John A. Van Auken, seismologist for Marine Exploration Co., at Houston, has been transferred to Denham Springs, La.

C. G. Tuttle, Cities Service Gas Co., has been transferred from the Wichita station to Petrolia, Kans., as station superintendent, and **M. J. Weckerling** has been transferred from Petrolia to the company's plant at Tallant, Okla., as superintendent.

Rayburn L. Foster has been named vice president and general counsel of Phillips Petroleum Co., and **Harry D. Turner** assumed the duties of assistant general counsel, vacated by Foster, consolidated with the office of general attorney.

N. C. Simpson, Gulf Oil Corp., has been named general manager of the Gulf Coast district production department, formerly called the Houston district. Others appointed to that division include: **R. A. Payne,** district exploration advisor and district manager of exploration; **E. P. Hubbard,** district exploitation advisor and district manager of exploitation; **C. B. Hussey,** district services advisor and district manager of services; **J. B. Victery,** assistant general manager; **E. L. Petree,** district superintendent of production; **W. A. Shellshear,** district superintendent of gas and gasoline; **P. B. Leavenworth,** district chief geologist; **Douglass Lanier,** district superintendent of land and leasing; and **G. H. Lacy,** district chief civil engineer.

W. R. Balfour, office manager at the Emeryville, Calif., laboratories for Shell Development Co., has been named treasurer of the firm.

Robert McMillan, of Geophoto Services, is the new president of the Rocky Mountain Association of Geologists. **Harry Thompson,** Shell Oil Co., was elected first vice president; **Robert Munoz** of Santa Fe Corp., second vice president; and **James Royds,** Continental Oil Co., secretary-treasurer.

Ronald H. Jenkins and **MacDonald Millard** have been named directors of Spooner Oils, Ltd.

Ray Harrison, formerly vice president, has been named vice president and general manager of Peoples Natural Gas Co. **A. B. Dilworth,** controller, was also named vice president of Peoples.

Landon Curry, formerly with Southern Geophysical Co., has joined Sunray Oil Corp. at San Antonio. He recently graduated from University of Texas with a B.S. degree in geology.

DEATHS

William Brown Bell, president of American Cyanamid Co., chairman of the board of Jefferson Chemical Co., and director of Southern Minerals Corp., died December 20 at Marrakech, French Morocco.

Louis Roark, 60, geologist and land department superintendent for Sunray Oil Corp., died December 29 in Tulsa.

John Halbert Joy, 60, with Magnolia Pipe Line Co. for the last 37 years, died in Houston on December 29. At the time of his death he was pipe-line-department superintendent.

George W. Carr, 51, geophysicist, died December 24 in Houston. He was president of Carr Geophysical Co. of Houston, and was formerly vice president of General Geophysical Co.

Jens Edward Nilsen, 66, chief engineer for the marine department of The Texas Co. for 20 years until his retirement last year, died in Port Arthur, Tex., on December 21.

Audley DeForest Gaston, 64, senior mechanical engineer at the Baytown, Tex., refinery of Humble Oil & Refining Co., died in Baytown, on December 26.

Okey Westbrook, 52, Mount Pleasant, Mich., drilling contractor, died December 26 at Saginaw, Mich.

Charles S. Morgan, early-day Oklahoma oil man, died in Brinkley, Ark., December 23.

The Shaffer Rotating Blowout Preventer and Stripper manufactured by the Shaffer Tool Works, Brea, Calif.

Molded Hycar parts by Murray Rubber Co., Houston, Texas

PROTECTION that's double against blowout trouble

THE risk of blowouts in high pressure areas, or wildcat locations, is so great that many operators are now giving their wells this double protection. In addition to the ram-type blowout preventer, you will find the Shaffer Rotating Blowout Preventer and Stripper on many wells as a double safeguard. And Hycar helps do the job!

This Blowout Preventer and Stripper is installed directly above the ram-type which is kept in open position during drilling operations.

The rotating blowout preventer employs a rubber stripper which is molded from a compound of Hycar OR-15. The Hycar stripper, which rotates with the drill pipe, is of a lipped design and tends to tighten the seal as pressure arises.

Hycar was chosen because of its superior oil-and-abrasion resistant qualities. It stands up against oil and gas which may be entrained in the drilling fluid, and is helpful if oil base mud is used. The stripper must also be tough to fight abrasion of steel slivers and other rough surfaces as drill pipe, tool joints, drill collars and Kelleys are moved through it. Here again Hycar comes through with colors flying. Hycar is also capable of high elongation without objectionable setting, so there is a tight seal around the pipe at all times.

Investigate Hycar's qualities for an improvement or development in other oil field machinery. For not only does Hycar resist oil, gas, heat, weather and wear, but it has many other advantages, too. For technical bulletins, please write Dept. HF-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

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Fig. 1—Above, left: State highway bridges crossed by trucks hauling equipment to the drilling site were reinforced temporarily.

Fig. 2—Above: This board road was installed, between bridges, from the state highway to the drilling site.

Fig. 3—Left: The initial bridge built on the access road project. This 60-ft. Bailey unit was set up during the first day's operation.

"TOUGHEST DRILLING LOCATION"

Cost of building access road to 8,000-ft. test was equal to cost of drilling the wildcat well

by Leigh S. McCaslin, Jr.
Gulf Coast District Editor

HOUSTON OIL CO. OF TEXAS has completed a wildcat test at one of the most inaccessible drilling locations in Gulf Coast oil history. The cost of building the access road and getting the equipment into the well site was equal to the cost of drilling the well—an 8,000-ft. test.

This unusual and difficult location is in the Sabine River bottom of Calcasieu Parish, southern Louisiana. The Sabine River marks the boundary between Texas and Louisiana. The well—Houston Oil's 1 Joe J. Fisher, et al.—was located only about a mile off a state highway. Nonetheless, it was necessary to build six bridges totaling 710 ft. in length, or one-seventh of the entire route, in order to reach the site. This bridge construction work was in addition to a difficult job of clearing and grading in the swampy terrain.

Two 25-year veterans of Gulf Coast oil—C. P. McKnight and C. R. Tucker—say it is the "toughest drilling location" they have ever encountered. McKnight is civil engineer for Houston Oil and Tucker is the company's drilling superintendent.

First work on providing access to the site began last April. At that time, McKnight and E. M. Quinn, also of the company's engineering department, spent 2 weeks on a detailed preliminary survey. The survey work consisted of an on-the-ground reconnaissance and a close perusal of the records of the U. S. Geological Survey and U. S. Army Engineers.

The preliminary survey revealed the following information on the proposed drilling site:

Terrain.—River bottom swampland. Large trees. Heavy underbrush. Black gumbo soil. Under water most of the year. Elevation at well site 17 ft. above mean sea level. Area under water most of the year. River has a hydraulic gradient of 1 ft. per mile.

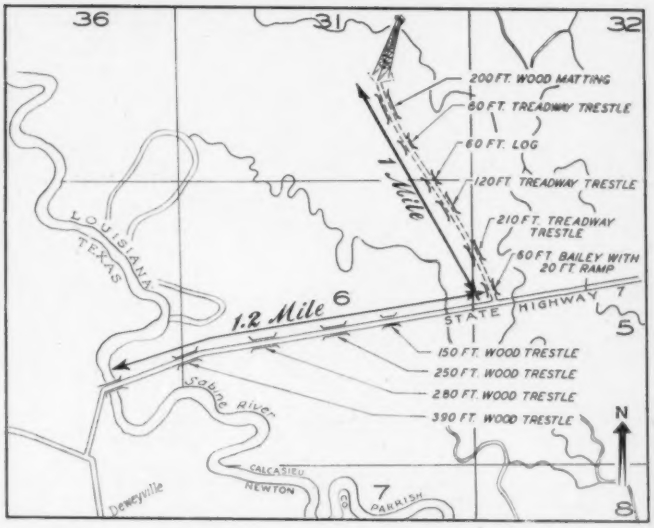
Weather.—(Geological Survey records dating back to 1908 were studied to determine weather data.) January is peak flood month. Two driest months are September and October. Hurricanes in the gulf affect the water level since the location is only 30 miles upstream from the mouth of the Sabine River. Some floods have inundated the well site with 6 ft. of water.

Approach roads.—Louisiana State Highway 7 passes within 1 mile of location. From the west, four wooden-trestle bridges with a rated load limit of 10 tons have to be crossed to reach the turnoff to the drilling site. From the east, five bridges with a similar load limit have to be crossed. (See drawing.)

A preliminary survey revealed that several major problems would be presented in the drilling of the proposed wildcat. Since Houston Oil would have loads as high as 45 tons while moving in drilling equipment, the initial problem was that of crossing the state-highway bridges. The State Highway Department would not permit such heavy loads on the wooden-trestle bridges.

The second major problem was presented by the weather. With only a 60-day dry period it would be

Fig. 4—Erection of this 210-ft. treadway trestle required less than 2 days.



Route of the access roadway from Louisiana State Highway 7 to drilling site.

necessary to evolve a plan that could be executed quickly. Also, the dry period (September and October) comes during the Gulf Coast hurricane season. A hurricane could cause high tides which would back up the river and inundate the location. Hence, from a weather standpoint, there was no absolutely safe procedure. Some calculated risks had to be taken.

Outside Aid Enlisted

After considerable thought, McKnight and Quinn enlisted Portable Bridge & Equipment Co. to help them with their problems. This relatively new company provides temporary bridging and emergency obstacle-crossing equipment on a service basis. It uses many of the materials and methods which were employed by Army engineers during World War II. *(See The Oil and Gas Journal, page 44, January 5, 1950.)* With emphasis on portability and speed of erection, Portable Bridge's equipment seemed to provide an answer to Houston Oil's problems.

To cross the state-highway bridges, Paul Robishaw, Portable Bridge engineer, suggested reinforcing them with steel treadways (Fig. 1). Steel treadways consist of two parallel steel channel beams tied together laterally by I-beams, channels, and pipe sleeves. They have a road surface of I-beam lock flooring. The treadways are normally used to form the roadway of a bridge. However, they can be installed on the top of existing bridges to take the bulk of the load, thus strengthening the structure. This procedure was proposed to the Louisiana State Highway Department, and was approved.

For the access road from the state highway to the drilling site, Portable Bridge supplied four bridges. These

Fig. 5—Construction of 60-ft. log bridge was carried on simultaneously with other operations.

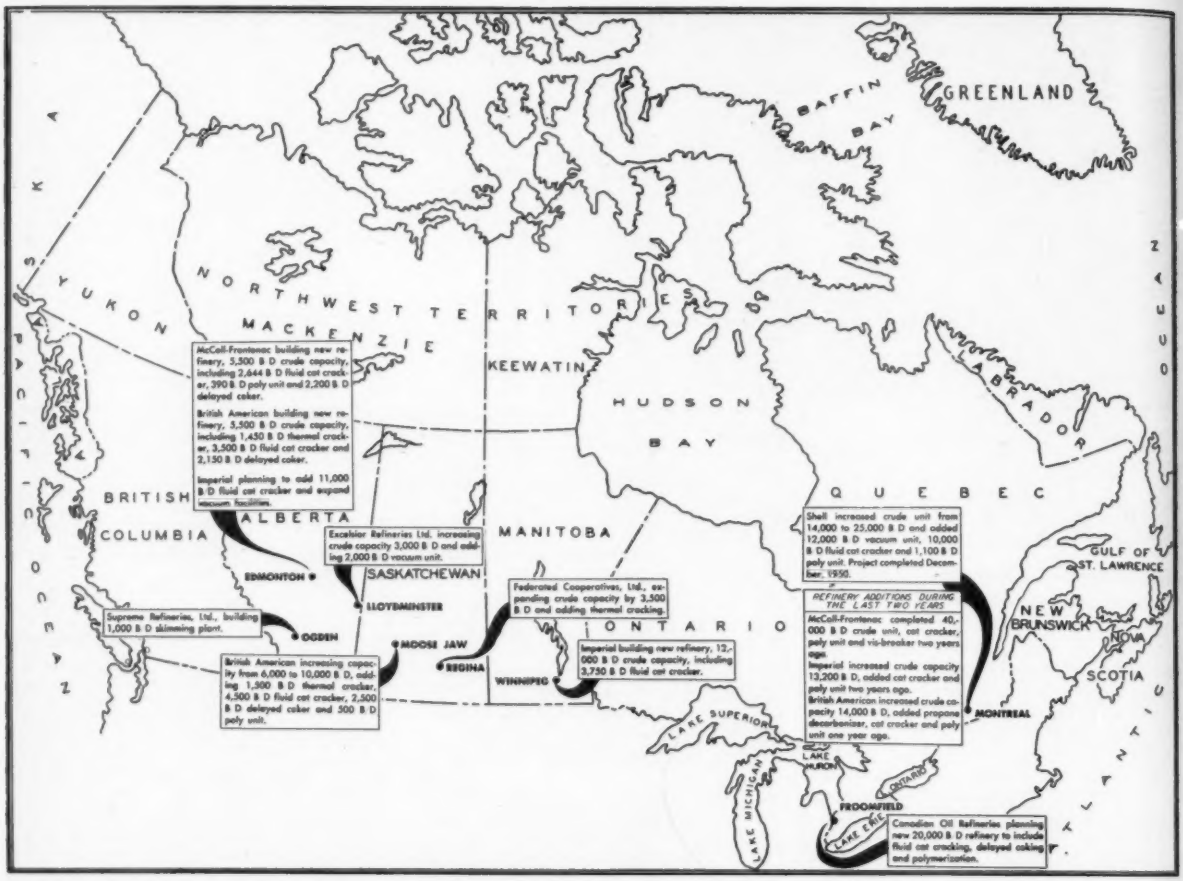
Fig. 6—This 200-ft. wood matting bridge is located near the drilling-site end of the project.

were in addition to a wood-matting bridge and a log bridge constructed by the road contractor, Windham & Sons, of Livingston, Tex. This concern cleared away the underbrush and laid a board road (Fig. 2) the length of the route.

In all, the six bridges totaled 710 ft. in length. The first one built was a 60-ft. Bailey unit (Fig. 3) erected by Portable Bridge. This structure was built on the first day of the access road construction project. It took the second day and part of the third day for Portable Bridge to erect a 210-ft. treadway trestle bridge (Fig. 4). On the fifth day, the company put up a 120-ft. treadway trestle bridge and the last structure built was a 60-ft. treadway trestle unit which was put in place on the seventh day of the project.

Windham & Sons built a 60-ft. log bridge (Fig. 5) and a 200-ft. wood-matting bridge (Fig. 6) for the project. Construction on these was carried on simultaneously with Portable

(Continued on page 63)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GULF OF ST. LAWRENCE
NEW BRUNSWICK
NOVA SCOTIA
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
ONTARIO
FROOMFIELD
McColl-Frontenac building new refinery, 5,500 B D crude capacity, including 2,644 B D fluid cat cracker, 390 B D poly unit and 2,200 B D delayed coker.
British American building new refinery, 5,500 B D crude capacity, including 1,450 B D thermal cracker, 3,500 B D fluid cat cracker and 2,150 B D delayed coker.
Imperial planning to add 11,000 B D fluid cat cracker and expand vacuum facilities.
Excelsior Refineries Ltd. increasing crude capacity 3,000 B D and adding 2,000 B D vacuum unit.
Supreme Refineries, Ltd., building 1,000 B D skimming plant.
British American increasing capacity from 6,000 to 10,000 B D, adding 1,300 B D thermal cracker, 4,500 B D fluid cat cracker, 2,500 B D delayed coker and 500 B D poly unit.
Federated Cooperatives, Ltd., expanding crude capacity by 3,500 B D and adding thermal cracking.
Imperial building new refinery, 13,000 B D crude capacity, including 3,750 B D fluid cat cracker.
Shell increased crude unit from 14,000 to 25,000 B D and added 12,000 B D vacuum unit, 10,000 B D fluid cat cracker and 1,100 B D poly unit. Project completed December, 1950.
REFINERY ADDITIONS DURING THE LAST TWO YEARS
McColl-Frontenac completed 40,000 B D crude unit, cat cracker, poly unit and vis-breaker two years ago.
Imperial increased crude capacity 13,200 B D, added cat cracker and poly unit two years ago.
British American increased crude capacity 14,000 B D, added propane decarbonizer, cat cracker and poly unit one year ago.
Canadian Oil Refineries planning new 20,000 B D refinery to include fluid cat cracking, delayed coking and polymerization.

Map shows 10 large refinery-expansion projects and commencements of complete new refineries. These are located both in the eastern part of the dominion and westward in Alberta's new oil territory, also along the route of the new Interprovincial Pipe Line System.

Canadian Refiners Spending $75,000,000 in

by George Weber
Refining Editor

THE greatest refinery-construction program in its history is now under way in Canada. Spurred by a record increase in consumption of all petroleum products, and the discovery of major domestic crude reserves, Canadian refiners have in the construction or design stages, an estimated $75,000,000 worth of plant building and modernization projects.

Five new refineries are projected, to process Alberta crude. In addition, modern facilities including added crude capacity, vacuum distillation, thermal cracking, reforming, catalytic cracking, delayed coking, and polymerization are going into six existing refineries.

Most of the new work centers in the three prairie provinces of Alberta, Saskatchewan, and Manitoba. Altogether, projects now under way or definitely planned will increase Canadian refining capacity roughly 65,500 bbl. to a total of 393,000 bbl. per day.

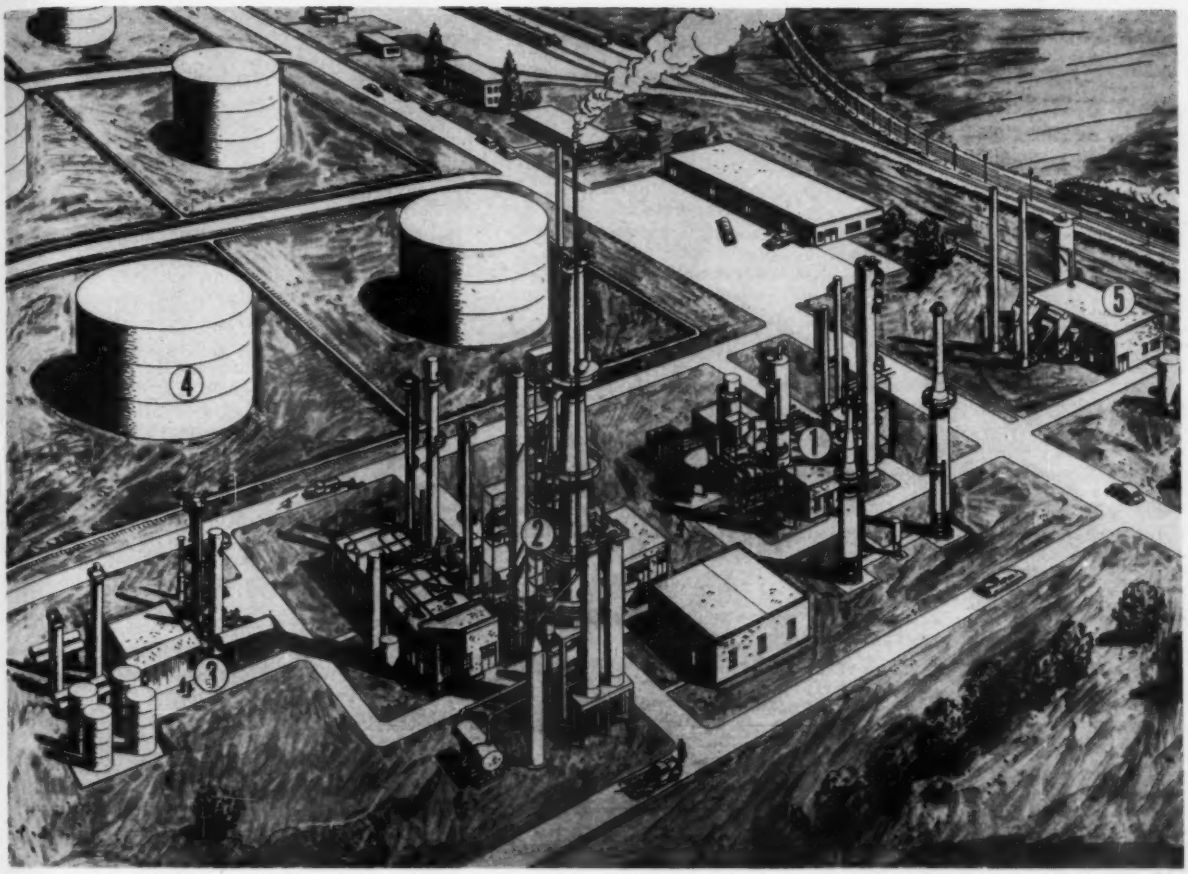
Catalytic cracking leads the new processing units now planned. Seven such installations are being added to the four existing ones in that country, thereby nearly doubling the national capacity for cat cracking. On completion of projects now in construction or design, Canada will have a total capacity for cat cracking 115,000 bbl. of feed per day to produce high-octane motor fuels and burning oils.

Montreal Phase Over

The current construction program follows closely a record expansion of the industry in Montreal East, where 40 per cent of the nation's capacity has been concentrated. In that Quebec city, four of the largest companies in the nation maintain major plants. Three have been expanded and modernized since the war and at the fourth a construction program will be complete by the end of this year.

Two years ago McColl-Frontenac Oil Co., Ltd., completed its Montreal East expansion program, adding a new 40,000-bbl. per day crude unit and new facilities for fluid catalytic cracking and polymerization, and converting an existing crude unit to vis-breaking operation. At the same time Imperial Oil, Ltd., added 13,200 bbl. per day to crude capacity of its nearby refinery and also installed fluid cat cracking and polymerization. Early this year, British American Oil Co., Ltd., completed its modernization program at Montreal East, adding 14,500 bbl. per day to capacity, and installing propane decarbonizing, fluid cat cracking, and catalytic polymerization.

Now essentially complete is the



This isometric drawing of the new Imperial Oil, Limited, refinery at Winnipeg shows (1) crude distillation, (2) fluid catalytic cracking and light-ends recovery, (3) central treating, (4) product storage, and (5) steam generation. Refinery will be completed this spring.

00 in Plant-Building and Modernizing Projects

New refinery construction and expansion in Canada will boost capacity from 65,500 bbl. to a total of 393,000 bbl. per day. Cat cracking leads the processing installations, but many other new units are included.

modernization and expansion project at the local refinery of Shell Oil Co. of Canada, Ltd. Crude units were rebuilt to boost capacity from 14,000 to 25,000 bbl. per day, a 12,000-bbl. vacuum unit was added, as were a fluid cat unit rated at 10,000 bbl. per day capacity and a polymerization plant capable of producing 1,100 bbl. of product daily.

With completion of the Shell project, attention turns westward to the prairie provinces where refining capacity will be increased 40 per cent by the end of next year. Once largely dependent on imported U. S. crudes, these western refiners have switched completely to domestic sources from Alberta.

Three of the nation's four largest companies are active in that region. British American and McColl Frontenac are building complete new refineries at Edmonton. British American is also modernizing at Moose Jaw. Imperial is adding a new refinery at Winnipeg and adding new facilities at Edmonton. Other smaller companies are expanding and modernizing plants in the three provinces. Excelsior Refineries, Ltd., is upping refinery capacity at Lloydminster by 3,000 bbl. and adding 2,000 bbl. per day in vacuum distillation capacity. Saskatchewan Federated Co-operative, Ltd., is expanding Regina capacity by 3,500 bbl. per day and Supreme Refineries, Ltd., is reported building a 1,000-bbl. per day skimming plant at Ogden, Alta.

McColl-Frontenac

McColl-Frontenac's complete new Edmonton refinery will employ fluid catalytic cracking, catalytic polymerization, and delayed coking to produce a maximum yield of distillate products from Alberta crudes. The refinery, costing approximately $10,000,000, is scheduled for initial operation next summer.

A full range of finished distillate fuels will be produced, including gasoline, kerosine, diesel fuel, range oil, and fuel oil. Heavy residual oils will be reduced to petroleum coke.

The single atmospheric crude unit will fractionate about 5,500 bbl. per day of Leduc or Redwater crudes into five straightrun fractions. In addition to conventional gasoline, kerosine, and diesel-oil cuts, a heavy straightrun gas oil will be withdrawn as a side stream to comprise the main catalytic cracking charge stock. When operating on Leduc crude, the atmospheric unit will reduce the charge to a 35 per cent residual frac-

tion, and Redwater crude will be reduced to about 41 per cent atmospheric bottoms. These topped crudes will be thermally cracked in the delayed coking unit.

The combination cracking and coking heater in the coke unit will serve two coking drums. The unit will charge daily, 1,934 bbl. of Leduc gas oil or 2,239 bbl. of Redwater gas oil, producing daily about 41 or 68 tons of coke respectively. Thermally cracked vapors will be fractionated into gasoline and naphtha streams for product blending, and gas-oil charging stock for the fluid catalytic unit.

The fluid unit is of stack design with reactor superimposed above the regenerator. Designed for charging 2,644 bbl. per day of fresh feed, the unit incorporates an internal stripper in the reactor vessel. A two-compartment stripper on the fractionating column will strip two selected side streams, allowing flexibility for producing fuel blends for varying seasonal demand. All cat cracked heavy gas oil will be recycled to the reactor. The light-ends recovery section comprises an absorber, a debutanizer, and a depropanizer.

Selected light ends will be charged to the catalytic polymerization unit, whose single reactor is capable of handling 20 bbl. of feed per hour.

Three copper chloride sweetening units will treat straightrun gasoline, cracked naphtha, and middle-distillate streams. Auxiliary facilities at the new McColl-Frontenac refinery include a steam plant, crude and product storage, pump house, control house, compressor building and office, laboratory, and workshop buildings. The refinery will use purchased electric power.

The contract for engineering and construction of all process facilities was let to Foster Wheeler, Ltd., with Foster Wheeler Corp. acting as subcontractor. Universal Oil Products Co. designed the catalytic polymerization unit and the fluid cat unit is of Foster Wheeler design. Offsite facilities were engineered by The Texas Co. and purchasing and erection is being handled by McColl-Frontenac personnel.

By late November, 85 per cent of all foundations were poured, and the refinery was considered about 15 per cent completed. Construction progress through this winter will be largely dependent on weather conditions, but completion is expected by midsummer of 1951.

Imperial Oil

The complete new Winnipeg refinery of Imperial Oil, Ltd., will have a rated capacity for processing 12,000 bbl. of crude per day. Alberta crudes moved eastward in the Interprovincial pipe line, will be delivered to Winnipeg through a 75-mile, 10-in. spur line connecting with Interprovincial at Gretna, Man.

Costing an estimated $10,000,000, the Winnipeg refinery will comprise atmospheric and vacuum crude distillation, fluid catalytic cracking, and conventional light-products recovery and light-distillate treating facilities.

Atmospheric crude distillation will separate light and heavy naphthas, kerosine, and gas-oil distillate fractions, reducing crude to a 40 per cent residual bottom fraction. The vacuum unit, equipped with a separate furnace, will further reduce this topped crude to about 15 per cent residuum, producing a 25 per cent yield of vacuum gas oil which will comprise the bulk of feed to the fluid catalytic cracker.

The fluid cat unit combines the reactor and regenerator in a single tower and has a rated capacity for handling 3,750 bbl. of total charge per day. It incorporates conventional light-ends-recovery facilities.

Caustic treating in a central plant will be provided for straightrun and cracked naphthas and cracked gas oil. The refinery's central control room will include a graphic panel. Crude will be desalted prior to charging to the atmospheric unit.

Auxiliary facilities at the refinery include a steam generator, an ethyl blending plant, crude and product storage, an administrative building, a testing laboratory, a mechanical shop, a warehouse, and lunch and locker buildings. Purchased electric power will be utilized.

Finished products including gasoline, kerosine, tractor fuel, diesel fuel, stove and furnace oils, and bunkering fuel will serve a consuming area embracing Manitoba and western Ontario.

Plant construction is expected to be better than 50 per cent complete by the end of 1950. The refinery is scheduled for initial operation in late spring. Ground was first broken in April of this year.

Engineering was carried out by Imperial's engineering and development division, Universal Oil Products Co. which designed the fluid catalytic cracking unit, and Canadian Kellogg, Ltd. Canadian Kellogg has the contract for construction of all process units, and local contractors share in erecting offsite facilities.

The refinery is designed and laid out to allow future expansion when justified by increased market demand. The crude pipe line serving the refinery has a capacity for delivering up to 30,000 bbl. per day.

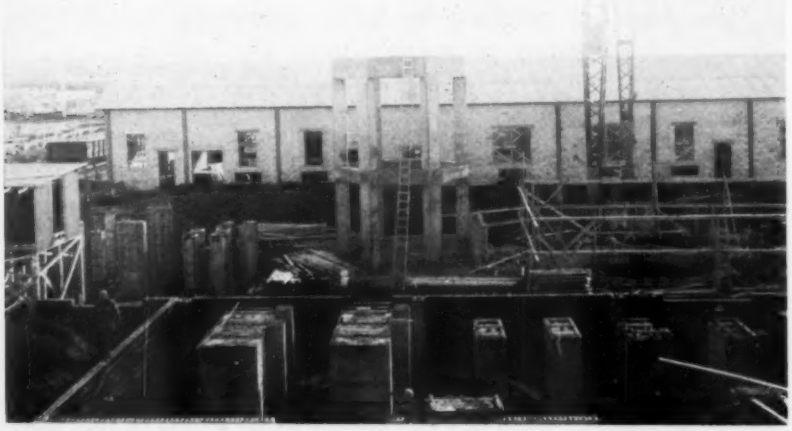
Keith Lewis, formerly superintendent of Imperial's Montreal East refinery, has been appointed superintendent of the new Winnipeg plant. The initial payroll is estimated at 175 employes.

British American

Early next summer at Edmonton, British American will commence operation of a modern 5,500-bbl. per day refinery representing one of the most versatile and flexible installations of its size ever designed. The plant will incorporate some new ideas in combined use of thermal cracking, catalytic cracking, and delayed coking to obtain maximum yields of high-value distillate fuels. It will permit operators readily to adapt runs in conformance with the varying seasonal demand pattern existing in western Canada.

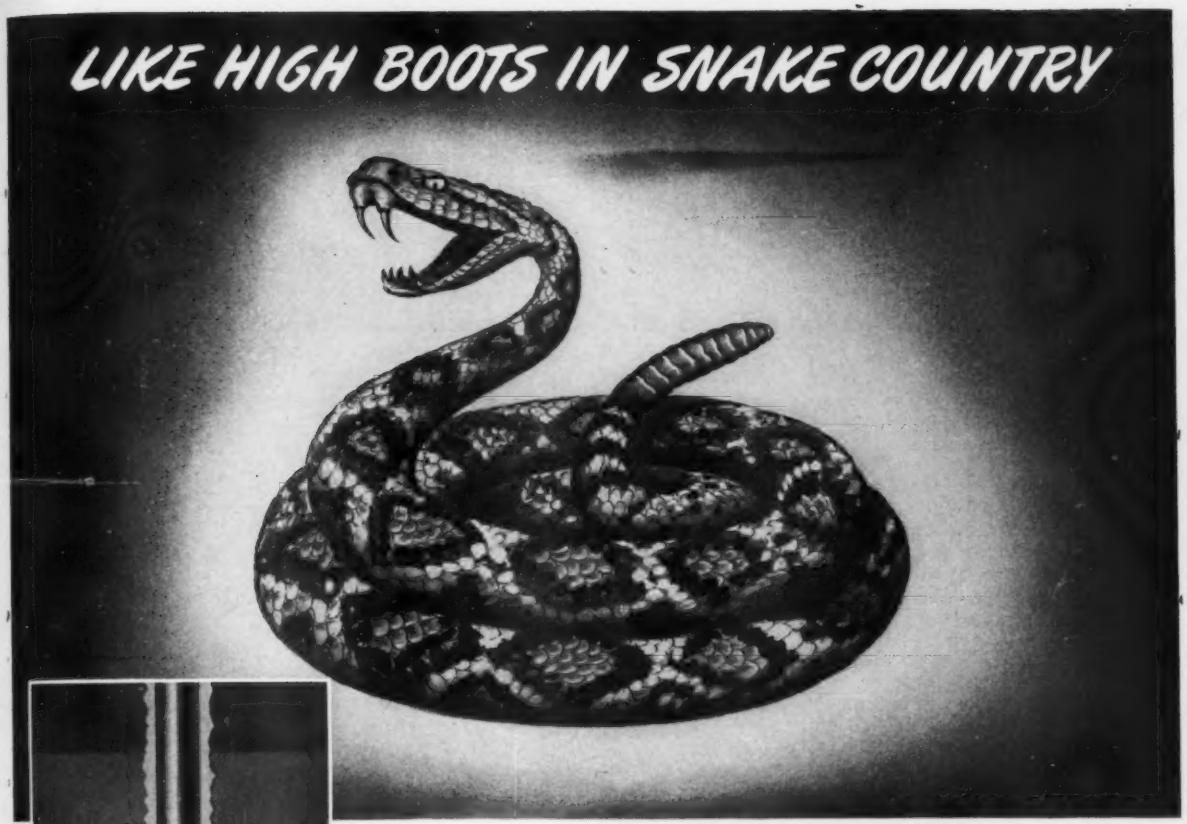
The complete new refinery, British American's fifth, will employ conventional process units in a closely integrated operation. Desalted Redwater crude charges to an atmospheric still which yields distillate cuts of straightrun gasoline, naphtha, kerosine, diesel fuel, and heavy gas oil, reducing crude charge to a 41 per cent residual fraction. The straightrun gasoline and naphtha streams are treated in two copper chloride units

(Continued on page 66)



At McColl-Frontenac Oil Co., Ltd.'s, new Edmonton refinery, unit foundations are in, and process housing is nearing completion. This modern 5,500-bbl.-per-day refinery will begin initial operation in midsummer 1951. This construction view taken last fall shows compressor building foundations in the foreground with fluid catalytic cracking unit foundations and compressor building in the background.

LIKE HIGH BOOTS IN SNAKE COUNTRY



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Processes for

Removal of Hydrogen Sulfide

from industrial gases

by Robert M. Reed,* Norman C. Updegraff,* and Joe L. Parker*

THERE is only one dry process for the removal of hydrogen sulfide in general use in the industry today. This is the iron oxide process which has been in almost universal use for many years for treating coal gas and carbureted water gas for city distribution. The equipment used consists of large chambers or "boxes" which contain trays of wood shavings impregnated with iron oxide.

The gas to be purified is passed through these boxes where the hydrogen sulfide is absorbed to form iron sulfide. The iron sulfide may be oxidized to iron oxide and sulfur by passing a small quantity of air through the boxes with the gas, or it may be reactivated with air separately. In either case, elemental sulfur accumulates in the iron oxide mixture until the sulfur content reaches about 50 per cent at which time the mixture must be replaced with a fresh charge. It is possible to extract sulfur from the spent material, and reuse the extracted material in the iron oxide boxes. This practice has been followed in Europe, but so far it has not been economical to do so in this country.

*Gas Processes Division, The Girdler Corporation. Presented at Natural Gasoline Association of America meeting, Tyler, Tex.

The removal of hydrogen sulfide from natural and manufactured gases is not a new problem. The objectable properties of this toxic and corrosive impurity are well known and need not be described in detail here. It should be pointed out, however, that hydrogen sulfide is almost as toxic as hydrogen cyanide and six times as toxic as carbon monoxide. The East Texas fields have been fortunate for many years in not having to deal with the desulfurization problem. Its recent appearance, however, has prompted the presentation of this article.

The chief advantages of the iron oxide process are that no moving equipment is required and the operation is quite simple. The principal disadvantages are that the ground-space requirements are quite large; and the labor of changing iron oxide charges becomes excessive for high-sulfur content gases. Furthermore, the process is not readily adaptable for high-pressure operations due to the size of the equipment.

In an effort to overcome some of these disadvantages, there has been some thought of using a fluidized process which would employ a moving bed of iron oxide with continuous regeneration. It has been pointed out, however, that this may not be feasible as the oxide would have to be kept dry to be free flowing whereas the reaction with hydrogen sulfide takes place only when the oxide is moist. In general, the recent improvements in the iron oxide process have been in developing a more reactive form of oxide to reduce the volume required and in designing improved boxes for easier changing of the oxide.

Wet Processes

The so-called wet processes utilize a solution containing a reagent which combines with hydrogen sulfide chemically to remove it from the gas stream. These processes all employ some type of contactor, such as a tray or packed tower, in which the gas to be treated passes upward countercurrent to the liquid flow.

Nonregenerative processes.—The first group of wet processes to be considered is the nonregenerative in which the reagent employed reacts with hydrogen sulfide to remove it from the gas stream. The reaction product is discarded periodically and replaced with fresh solution. In general, these processes are not economical for large quantities of hydrogen sulfide as the cost of replacing the reagent becomes excessive. They do have their use when the quantity of hydrogen sulfide is small and for cleaning up residual hydrogen sul-

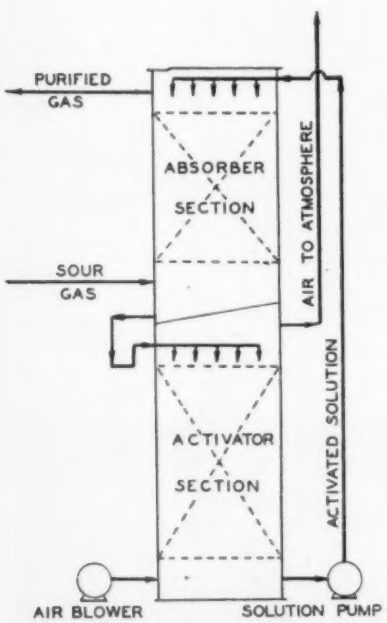

Fig. 1—Diagram of Seaboard process.

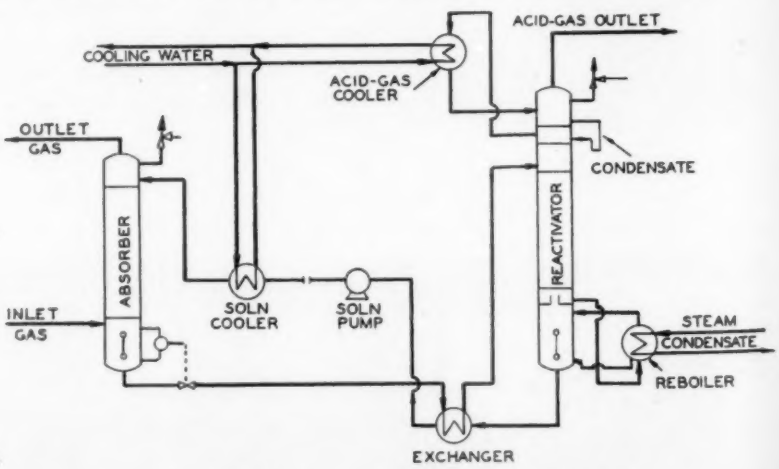

Fig. 2—Flow scheme of Girbotol process (patented).

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fide after the bulk has been removed by some other process.

The most commonly used process in this category employs a solution of caustic soda which can remove hydrogen sulfide almost completely. Some purification plants employ the lime-slurry process in which a suspension of calcium hydroxide is used. Both of these processes absorb carbon dioxide as well as hydrogen sulfide from the gas.

Two other such processes are used for removing small amounts of hydrogen sulfide from carbon dioxide-bearing gases. One process, employing potassium permanganate solution, is widely used for purifying carbon dioxide gas before liquefaction and production of dry ice. The other process utilizes a buffered solution of sodium bichromate and zinc sulfate. As the quantities of hydrogen sulfide present are very small, the reagent cost for both these methods is negligible.

Regenerative processes.—Due to the excessive replacement cost of the reagents used in the nonregenerative processes, and the problem of disposal of the products, it is desirable to use an absorbent which may be regenerated and recycled whenever appreciable quantities of hydrogen sulfide are involved. Several successful schemes have been developed for this purpose which accomplish regeneration by steam or air stripping.

Apparently the first of the regenerative processes to be used on an industrial scale was the Seaboard process developed by Koppers Co. in 1920. This process employs an aqueous solution containing 3.0 to 3.5 per cent sodium carbonate which contacts the sour gas in a packed or bubble-tray absorber. One scheme used is shown in Fig. 1 in which the absorber is mounted on top of the activator. The hydrogen sulfide-bearing solution flows by gravity from the absorber section to the activator section where it is regenerated by blowing air through it.

The released hydrogen sulfide passes out with the air and is lost to the atmosphere. Some plants have utilized this exhaust air for combustion air in boilers which not only takes advantage of the heat of combustion of the hydrogen sulfide, but also exhausts the sulfur as sulfur dioxide which is somewhat less obnoxious than hydrogen sulfide.

The major advantages of the Seaboard process are the inexpensive reagent used and the small space required in comparison with iron oxide boxes. As the air blowing produces some thiosulfate, it is necessary to add fresh soda ash to the solution regularly and discard part of the solution, to maintain the proper concentration and composition. However, the low cost of sodium carbonate makes this relatively inexpensive.

The major disadvantage of the Seaboard process is the fact that sodium

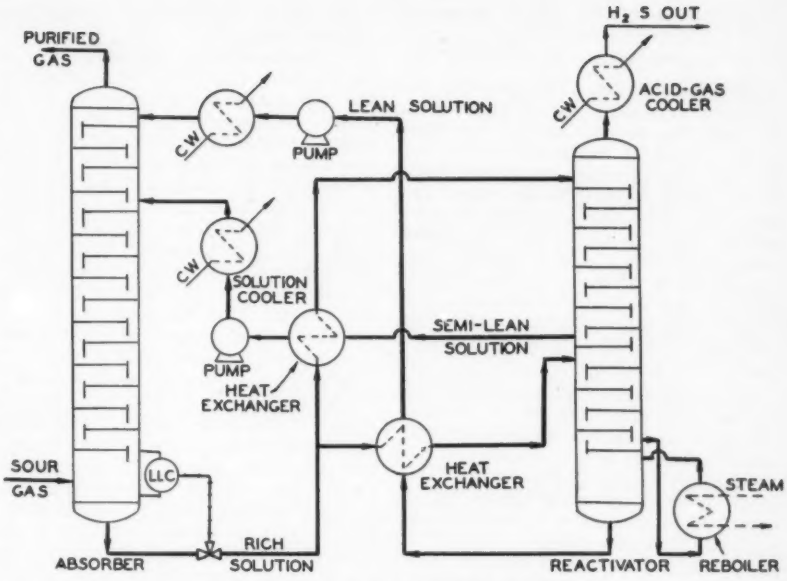

Fig. 3—Diagram of split-flow Girbotol process.

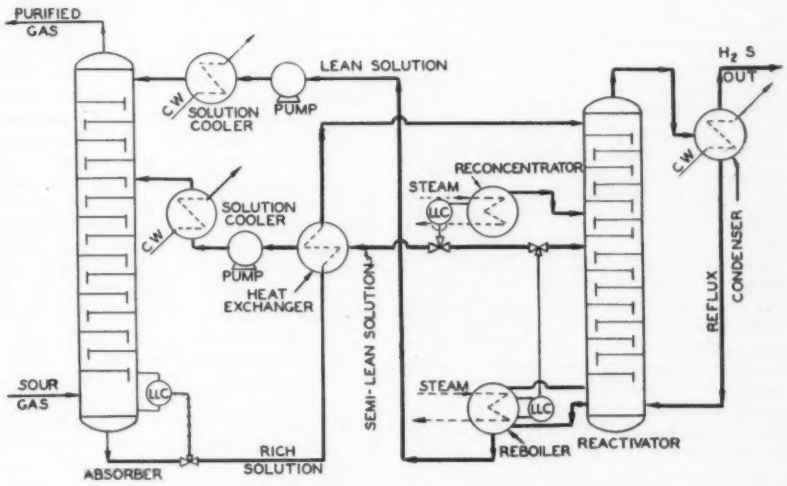

Fig. 4—Split-flow phosphate process arrangement.

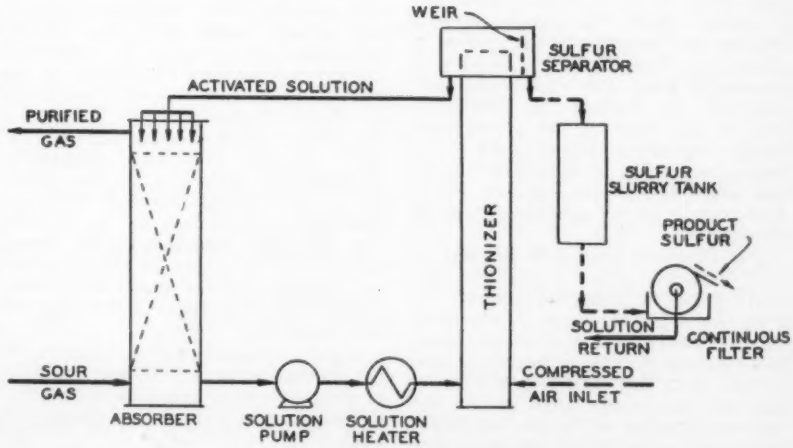

Fig. 5—Diagram of Thylox process.

carbonate is not an active absorbent and the removal of hydrogen sulfide from the treated gas is not complete.

Girbotol process.—This process, developed originally by Girdler Corp. in 1930, has become one of the most widely used at the present time for the removal of hydrogen sulfide from natural and refinery gases, there being many more installations in these fields than all the other processes combined. The use of amines in this regenerative process is based upon the fact that at low temperatures the amines, like ammonia, form salts with hydrogen sulfide which dissociate readily on heating.

The amines used commercially are the ethanolamines of which triethanolamine was the first to be employed since it was the first to become available in commercial quantities. The more reactive monoethanolamine is now generally employed for natural gas purification except in special cases where selective hydrogen sulfide removal is required (see below). Diethanolamine is widely used for the removal of hydrogen sulfide from refinery gases, since, unlike monoethanolamine, it has been found to be inert toward carbonyl sulfide, which is usually present. These amines are generally utilized in aqueous solution, although other solvents have been employed for special purposes.

The basic Girbotol flow scheme is shown in Fig. 2. The sour gas enters the base of the contacting tower or absorber and flows up countercurrent to the absorbing solution. The purified gas passes out the top of the tower. The hydrogen sulfide bearing, or rich solution, passes out of the bottom of the absorber, through heat exchangers, and to the reactivator. In the reactivator, the down-flowing solution is heated and stripped of hydrogen sulfide by ascending steam generated by boiling the solution in a reboiler at the base of the tower. The heat for this reboiler is supplied by steam, hot oil, direct firing, or other means.

The hydrogen sulfide and steam pass from the top of the tower into a cooler where the steam is condensed and returned to the system or discarded. The hydrogen sulfide is separated from the condensate and available for further use. The solution at the base of the reactivator, which has been essentially stripped of hydrogen sulfide, is recycled through the heat exchanger, further cooled with water or air, and returned to the absorber.

The Girbotol process in its various modifications gives consistent gas purification to a degree comparable with the dry iron oxide box process and the nonregenerative caustic soda process, namely to a negative lead acetate test. The high degree of purification obtainable with amine solutions, together with the relatively low steam requirement for regeneration has been responsible for their widespread adoption for hydrogen sulfide removal.

A disadvantage of the Girbotol process has been the relatively high cost of the ethanolamines as compared with other absorbents, this necessitating special precautions to avoid mechanical losses and vaporization and neutralization or oxidation losses. The many impurities present in manufactured gases—tars, cyanogen, and oxygen—have discouraged the commercial use of amine solutions for purifying such gases, although pilot-plant operations have indicated that suitable pretreatment of the gases may overcome these difficulties.

A large number of improvements in the use of amines for gas purification have been made since 1930 and some of these are in commercial use at present. The Hutchinson patent covers the use of certain combinations of amines and polyhydric alcohols such as diethylene glycol as used in the glycol amine process of Fluor Corp. These have been found effective for purifying natural gas for pipe-line transmission while at the same time dehydrating it sufficiently to avoid difficulties due to hydrocarbon hydrates in the transmission lines. However, since ethanolamines are equal in hygroscopicity to diethylene glycol, a similar result may be obtained with solutions containing ethanolamines alone, or ethanolamines with minor proportions of glycols and other materials. Another improvement in general commercial use covers the use of superatmospheric pressure (15 to 70 psig.) for the more complete regeneration of monoethanolamine solutions with a subsequent saving in steam required.

In order to obtain still more efficient use of stripping steam, the basic flow scheme has been modified in two Girbotol plants to the "split flow" shown in Fig. 3. A portion of the rich solution from the absorber flows to the top of the reactivator, passing half way down it in counter flow to stripping steam and then flows back through heat exchangers and coolers to a point part way down the absorber. This semi-lean solution can absorb much hydrogen sulfide, but contains too much to completely purify the gas. The remainder of the rich solution from the absorber flows to the midpoint of the reactivator down through the lower section and the reboiler, being completely stripped of hydrogen sulfide. This lean solution flows through heat exchangers and coolers to the top of the absorber, where it effects complete removal of the residual hydrogen sulfide from the gas stream. Both solution streams flow to the base of the absorber.

Amine solutions, particularly aqueous diethanolamine solutions, are also in general use for the removal of hydrogen sulfide from liquid hydrocarbons.

Phosphate process.—The Shell phosphate process uses the same general flow scheme as the basic Girbotol process, but employs a solution of tripotassium phosphate. For maximum efficiency in hydrogen sulfide removal from gas streams a split-solution-flow scheme as shown in Fig. 4 is recommended which is different in some respects from the Girbotol split-flow scheme shown previously. Here the semi-lean solution is also introduced toward the middle of the column so that it may pick up the bulk of the hydrogen sulfide and the final cleanup of the gas is accomplished in the top half of the column by contacting it with lean solution. In this scheme, however, the combined solution is all pumped through a heat exchanger to the top of the regeneration column where the hydrogen sulfide is stripped with steam.

Approximately half way down the tower the total solution is diverted by a catch tray into a reconcentrator which acts as a primary reboiler. The remainder of this solution is returned to the reactivator for further stripping, passes through the reboiler and after being cooled, is pumped back to the top of the absorber as lean solution. Here, too, the hydrogen sulfide regenerated is available in concentrated form for the production of sulfur or sulfuric acid.

The main disadvantage of the phosphate process is that it requires somewhat more steam for reactivation than the Girbotol process. Offsetting this somewhat is the lower volatility of the absorbent which results in a lower solution makeup. Another advantage of this process is that some selectivity for absorbing hydrogen sulfate in the presence of carbon dioxide may be obtained by proper design. This will be discussed later in this paper. The phosphate process may also be used for treating liquid hydrocarbons.

Alkazid process.—This process, which was developed and used in Germany, employs a flow diagram similar to the processes previously described in this section. The three absorbents employed are varied according to the usage. Solution "M" is sodium alanine which is a primary amine and is used for the removal of hydrogen sulfide or carbon dioxide or both from gas streams. Solution "Dik" contained the potassium salt of diethyl or sometimes dimethylglycine and is used for the selective removal of hydrogen sulfide in the presence of carbon dioxide or when small quantities of carbon disulfide or hydrogen cyanide are present. Solution "S" was developed for the purification of coke-oven gas and is reported to be a solution of sodium phenolate.

The Alkazid process has not been used in this country, as those developed here for the same purposes have been more satisfactory. One of the major problems connected with this process has been corrosion from the

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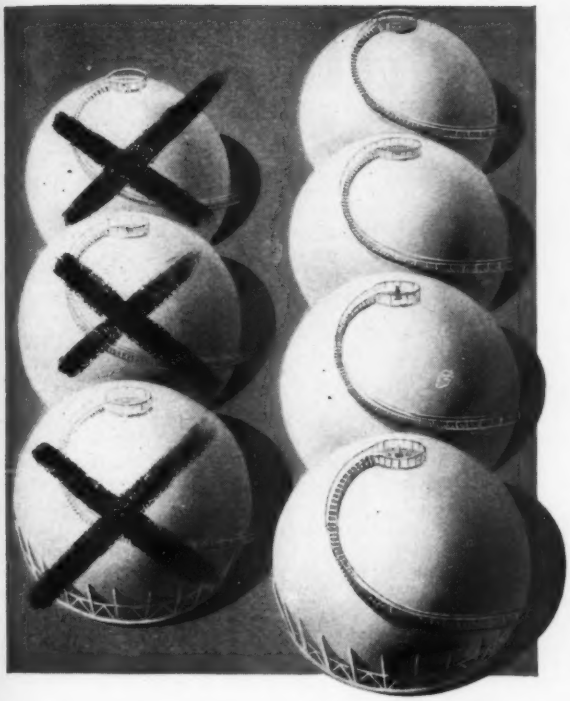

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PROGRESS REPORT: PORTILLA FIELD

by Joseph A. Kornfeld
Houston District Editor

This San Patricio County, Texas, field, where 19 oil wells are on production, has five reservoirs, ranging from 6,000 to 8,100 ft. in depth. A gas-conservation project is scheduled for early completion in the field

SINTON, Tex.—Less than 10 months after its discovery, Portilla oil field, located 5 miles northeast of this city in San Patricio County, Texas, has 19 oil wells on production with a calendar-day allowable of 6,775 bbl. for December 1950. Superior Oil Co. owns all of the oil wells drilled to date on the M. S. Welder ranch, although Plymouth Oil Co. has a single gas-distillate discovery nearby from a fifth, shallowest reservoir.

While Superior officials offer no estimate as to the ultimate number of oil wells that may be found productive on the Portilla structure, one South Texas geologist predicts that an additional 40 locations, drilled on the present spacing pattern, lie within the productive limits indicated from present known structural and reservoir data.

Portilla represents Superior's most important South Texas development. No dry holes to the present reservoirs have been drilled within the oil field at this writing. Four rigs are now active on the Welder ranch development.

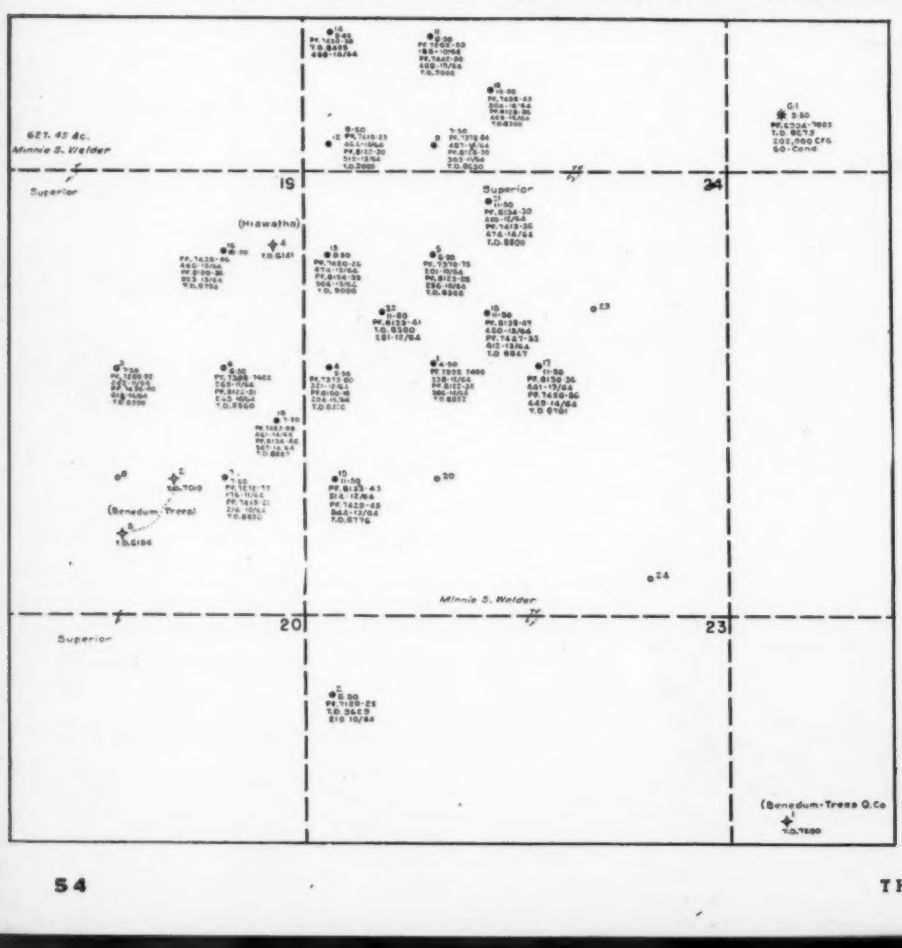
Five reservoirs.—Although four oil reservoirs and a gas-condensate reservoir have been discovered at Portilla, ranging from 7,000 to 8,100 ft. in the Frio (Oligocene) series, the majority of the oil-well completions have been made in the 7,400 and 8,100-ft. reservoirs. With the exception of three wells in the 7,300 and 7,400-ft. oil reservoirs, all completions have been of the dual type.

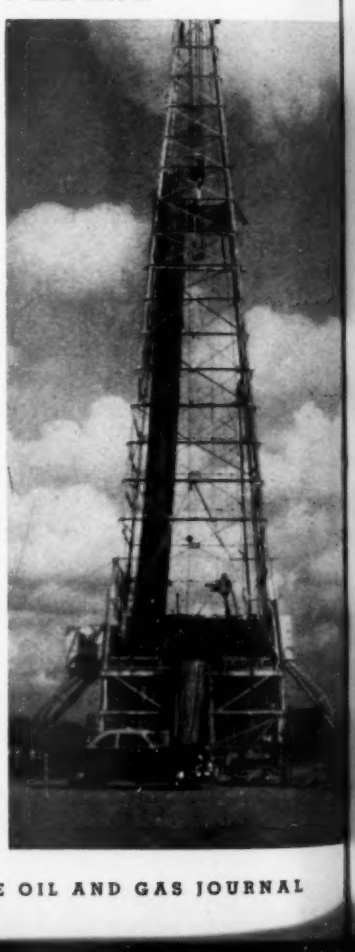
Oil Allowables

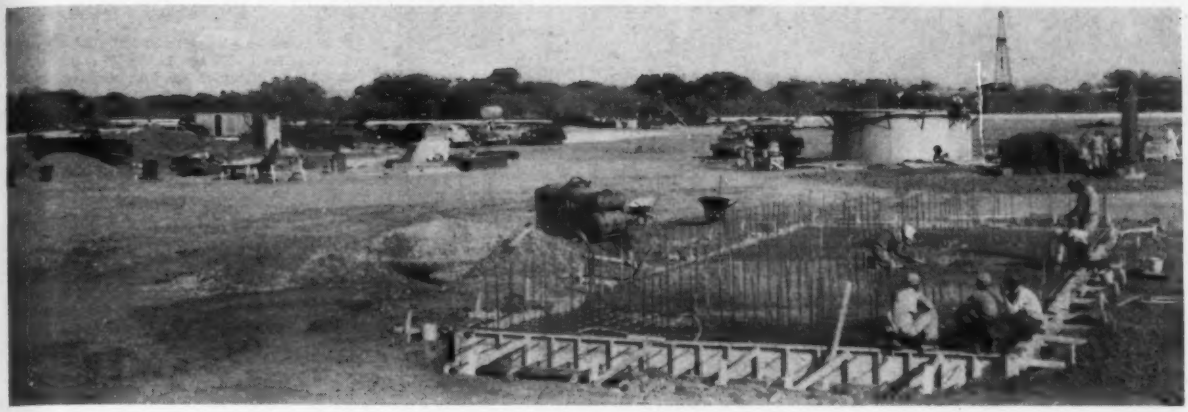
Tenders for the month of December 1950 for Portilla field have been approved by the Texas Railroad Commission for moving 210,000 bbl. of oil. This amounts to 6,775 bbl. per calendar day for the entire field.

The 7,100-ft. reservoir has one completion with a new-pool allowable of 88 bbl. per calendar day. The 7,300-ft. zone is allotted a new-pool allowable of 160 bbl. per calendar day. The 7,400 and 8,100-ft. reservoirs are each assigned a per well allowable of 300 bbl. per day; hence each new dual completion made in these two latter reservoirs adds 12,000 bbl. addi-

Fig. 1—(Left) Field plat of Portilla oil and gas field, San Patricio County, Texas. (Base map, courtesy Zingery Map Co., Houston). Right: POWER RIG.—View of power rig of Parker Drilling Co. working for Superior Oil Co. at 23 Minnie S. Welder in Portilla oil field, San Patricio County, Texas. Crews are pulling drill pipe after reaching contract depth of about 9,000 ft.







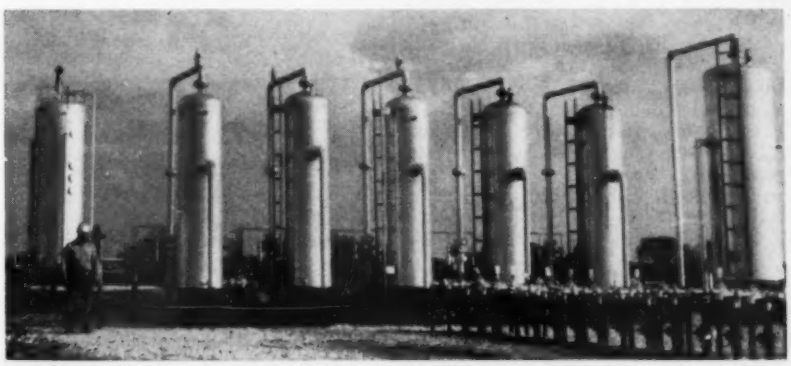
COMPRESSOR PLANT.—Construction view in Portilla field showing Brown & Root, Houston, contractor for Superior, preparing concrete foundations to house compressors. Produced gas will be compressed and returned to two reservoirs.

tional allowable for the month since the field operates under a December 1950 schedule of 20 producing days.

Crude outlet.—Republic Pipe Line Co. gathers the oil through a main line which joins two 4-in. lines extending for a total distance of 21,000 ft. west and north from its Welder station northeast of Sinton. The crude is transported via pipe line to its Corpus Christi terminal. At this point it is transferred to barge tows and steamship to the Texas City refinery of Republic Oil Refining Co. for its purchasing account. Welder station field storage facilities comprise two groups of two 5,000 and four 5,000-bbl. tanks.

Gas conservation.—Superior officials state that a gas-conservation project will be completed during this month to return an estimated 5,000 to 7,000 M.c.f. per day of produced gas to the gas caps of the 7,400 and 8,100-ft. reservoir. The injection well will be its 22 Welder which is now being equipped for dual injection. Present plans call for utilization of about 600 hp. of compressor capacity.

DISCOVERY WELL.—Superior Oil Co. 1 Minnie S. Welder, discovery well of Portilla field. H. W. Harding, petroleum engineer, left, is shown with E. E. Kendall, tool pusher, both with Superior.



SEPARATORS.—Separators, heater-treater, and manifold arrangement at No. 1 tank battery of Superior Oil Co. in Portilla field. Henry Rodgerson, Superior construction roustabout, is shown in foreground.

Field Development

Portilla field was discovered on February 24, 1950, by Superior 1 M. S. Welder, a wildcat located 2,310 ft. from the north line and 3,630 ft. from the east line of Section 24, in a subdivision of the Eliza M. Welder ranch. The 8,593-acre lease in the C. J. Franco, E. and F. R. Portilla Surveys, A-25 and A-26 comprises Sections 18 to 25 inclusive.

The well was spudded on January 13, 1950, and was drilled originally to a total depth of 7,000 ft. where it was shut down. On January 26, 1950, a drill-stem test run at 5,712 ft. with packer set at 5,702 ft. recovered 75 ft. of gas-cut mud in ½ minute but packer failed. Operators cored another foot and took another drill-stem test. With packer set at 5,706 ft., it recovered 220 ft. of oil-cut mud and the maximum bottom-hole pressure was 220 psi. in 34 minutes. However, orders were issued for deepening the well which resulted in the discovery of both the 7,400 and 8,100-ft. zones. From the 8,122-32-ft. zone, it drew a state potential of 506.77 bbl. of 39.1° oil per day through a 14/64-in. choke with a gas-oil ratio of 728 to 1. In the 7,392-7,400-ft. zone it made a state potential of 338.17 bbl. of 40.4° oil per day through a 12/64-in. choke with a gas-oil ratio of 730 to 1.

7,100-ft. zone.—On May 2, 1950, the field was extended 4,100 ft. southwest of the discovery, with Superior 2 M. S. Welder, the 7,100-ft. zone discovery. It was drilled 330 ft. from the west line and 990 ft. from the north line of Section 23. The deepest drilled well in the field, it was carried to a total depth of 9,629 ft. and the long string was set and cemented 2 ft. off bottom. It was plugged back and gun-perforated from 7,120-25 ft. in the pay topped at 7,110 ft. Initial state potential was 210.41 bbl. of 41.8° oil per day through a 10/64-in. choke, with a gas-oil ratio of 1,535 to 1.

7,300-ft. zone.—An intermediate reservoir discovery—the 7,300-ft. zone—was opened on June 4, 1950, at Superior 7 M. S. Welder. It was drilled

DRILLING CREW.—Shown on the derrick floor of Parker Drilling Co. power rig at Superior 23 M. S. Welder at Portilla: G. N. Senf, derrick man; Amedee Terrebonne, Jr., floor hand; R. D. Sheive, floor hand; E. J. Decuire, motorman; J. C. Broussard, driller, and A. C. Ledet, pusher.

to a total depth of 8,850 ft. where the 7-in. pipe was set. From the 7,300-ft. reservoir it made 175.28 bbl. of 40.1° oil per day through a 11/64-in. choke through gun perforations from 7,272-77 ft. Completion was also made from 7,415-21 ft. in pay topped at 7,416 ft. for a state potential of 261 bbl. of 40° oil through a 10/64-in. choke, with a gas-oil ratio of 898 to 1.

7,000-ft. zone.—The shallowest reservoir at Portilla at present is the 7,000-ft. gas-condensate level discovered on June 8, 1950. It is Plymouth Oil Co. G-1 R. H. Welder, staked 660 ft. from the west and south lines of Section 32, in the R. H. Welder subdivision. Drilled to an original total depth of 8,279 ft., it was plugged back and 5½-in. pipe set at 7,221 ft. It was gun-perforated from 6,994-6,705 ft., with 65 shots. On initial state potential it produced 202 M.c.f. per day through choke. Gas-condensate ratio was 43,348 to 1, and distillate gravity was 60.6° A.P.I. This is the only successful completion made in this reservoir.

Steam Rigs

Well Drillers, Inc., Houston, who operates two steam rigs in the field for Superior, drilled the field discovery and 11 other wells. One rig has an Emsco draw works with 7½-in. jack shaft, 7½-in. line shaft, and an 8-in. drum shaft; the other has a 9-in. drum shaft, a 7½-in. line shaft, and a 7½-in. jack shaft. Each is equipped with 40-in. single-rotor brakes. Both utilize 27½-in. rotaries with separate rotary drive equipped with a 300-hp. vertical drilling engine.

Mud pumps.—The most popular size of mud pumps is 20 by 15 by 7¾ in.

Boilers.—Batteries of four 150-hp. boilers with a working pressure of 350 psi. are employed in this field. Boiler-feed pumps are two 10 by 4½ by 10 in., and are equipped with automatic gas-firing controls. Gas is delivered to the rig at 400 psi. Two generators of 10-kva. rating each are used for rig lighting.

Steel mud tanks.—Steel mud tanks are becoming more popular along the Gulf Coast. This contractor uses two tanks per rig, each measuring 30 by 5 by 8 ft.

Drill pipe.—At Portilla, 4½-in. o.d. 16.60-lb. drill pipe is used. Crews start with three drill collars and continue with this practice to contract depth.

Derricks.—Well Drillers, Inc., use standard 136-ft. steel derrick with 30 by 30-ft. base. Substructures are 7.3 ft. high.

Hole size.—Due to change in casing practices at Portilla, this contractor has altered hole-size practices accordingly:

	Prior practices		Current practices	
	Hole size (in.)	Pipe size (in.)	Hole size (in.)	Pipe size (in.)
Surface	15	10¾	16	11¾
Frio series	9⅞	7	10⅝	7

Days to drill.—Using steam equipment, Well Drillers, Inc., drilled a 8,405-ft. hole in 35 days, including rigging-up and tearing-down time. Correlation of time on bottom from well to well has been consistently satisfactory. The amount of wireline coring and drill-stem testing below 7,000 ft. will greatly influence the number of days to drill.

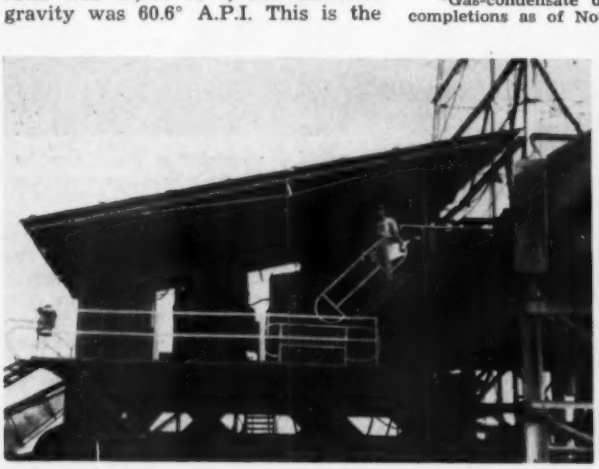
Stringing lines.—Eight lines are strung when rigging up. However, when the long string is run, 10 lines are used.

(Continued on page 63)

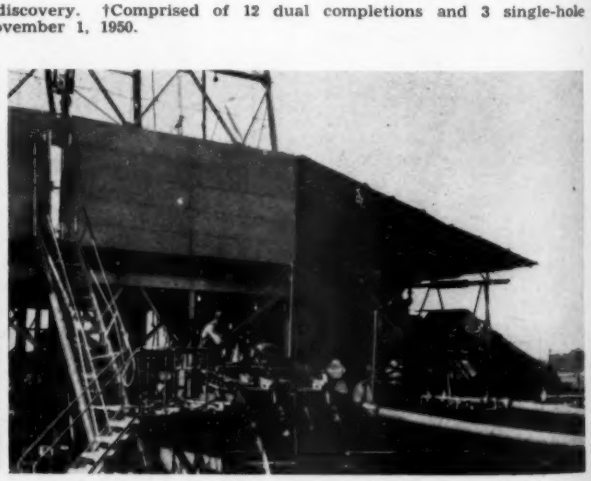
ANALYSIS OF COMPLETIONS AND ALLOWABLES BY RESERVOIRS—PORTILLA FIELD, SAN PATRICIO COUNTY, TEXAS

Reservoir—	Average pay depth	Discovery date	Gravity, °A.P.I.	Number of wells	Oil allowable, bbl. per calendar day: Per well	Oil allowable, bbl. per calendar day: Zone total
7,000 ft.	6,994	6- 8-50	*60.6	*1	*0	*0
7,100 ft.	7,110	5- 2-50	41.8	1	88 NPX	88
7,300 ft.	7,296	6- 4-50	40.1	3 duals	160 NPX	480
7,400 ft.	7,401	2-24-50	40.4	12 duals 1 single	300	3,900
8,100 ft.	8,123	2-24-50	39.1	9	300	2,700
				†15		7,168

*Gas-condensate discovery. †Comprised of 12 dual completions and 3 single-hole completions as of November 1, 1950.



DIESEL ENGINES.—Battery of three 350-hp. diesel engines on Parker Drilling Co. power rig working for Superior at 23 Minnie S. Welder, Portilla field. A. C. Ledet, rig pusher for Parker, is shown on stairway.



STEEL MUD TANKS.—At Portilla, steel mud tanks are popular. View at Parker Drilling Co. power rig working as 23 M. S. Welder for Superior Oil Co. G. N. Senf, derrick man, is shown checking returns at the shale shakers.

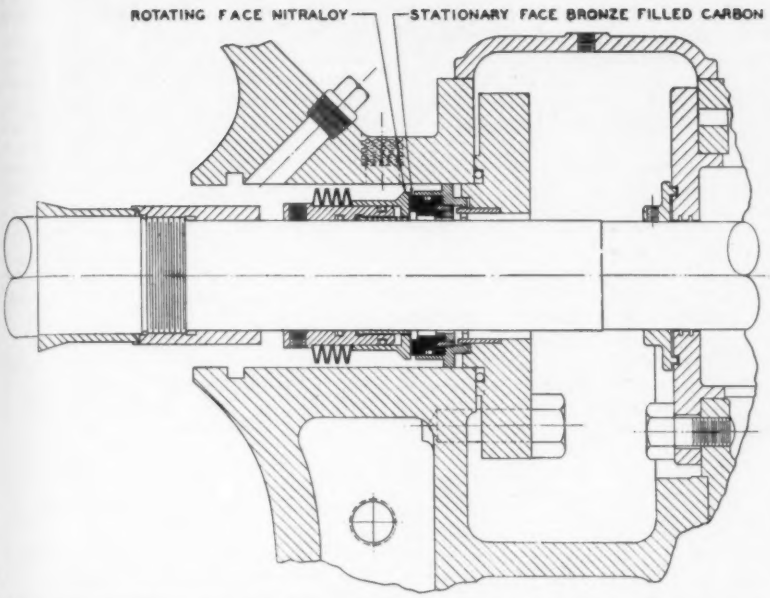


Fig. 1—Cross-sectional view of typical mechanical seal installed in Plantation Pipe Line Co. main-line pumps.

Mechanical Seals Effective On Main-Line Pumps

Test seals have exceeded 10,000 hours of trouble-free operation and all Plantation pumps will be so equipped

by M. J. Dabney* and W. W. Holt, Jr.*

PLANTATION PIPE LINE CO. set up a project in 1946 to develop and service test mechanical seals for large centrifugal pipe-line pumps to replace the soft metallic packing which is conventionally employed as a seal between the pump case and rotating shaft. The objective of this project was the development of a seal for pumps with shaft diameters of 2½-in. rotating at 3,600 r.p.m. on pressures up to 850 psi. The requirements of such a seal was that it must operate satisfactorily on all refined petroleum products from fuels to liquefied petroleum gases.

An experimental test station was constructed at Doraville, Ga., adjacent to Plantation's Doraville pump station. The test station was designed to conduct tests on experimental mechanical seals using liquid propane as the test liquid. Experience indicated that seals which would operate satisfactorily on propane would be satisfactory on other refined products.

Equipment at the experimental station consists of two 550-gal. propane storage tanks which are placed 9 ft. above and 60 ft. from the test shelter. Two triplex reciprocating pumps are connected to a suction manifold and take suction from the center of one storage tank. Either pump is capable of supplying liquid propane for the test seals at a continuous pressure of 850 psi., and for short intervals, pressures of 1,000 psi. A seal tester, or screening unit is connected to the discharge of each triplex pump. Pressures are regulated by Grove back-pressure regulators.

Surge tanks connected to the discharge of the triplex pumps damp pressure surges at the seal testers to 5 psi. The seal testers were designed to duplicate all stuffing-box and shaft conditions found in the three-stage, 8 by 10-in. Byron - Jackson main-line pumps. Propane flow from the screening units is returned to the other storage tank to complete the flow cycle. Relief valves are provided on the discharge of the pumps and relieve directly to the storage tanks. Vapor relief valves are located on the tops of the storage tanks and relieve directly to the atmosphere.

Three different types of mechanical seals were investigated at the start of this development program. These were:

1. **Double oil seal.**—This type consists of two sets of seal faces between which seal oil is pumped under pressure. Seal oil pressure is maintained and follows the pressure of the product to be sealed. This type of seal offers the advantage of no leakage and no contamination of the product. Double oil seals, however, require seal oil pumps, oil reservoir, piping heat transfer unit to cool the seal oil, and an oil-recovery system. An automatic pressure-control system or manual adjustment by operating personnel is also necessary to follow changes of pressure of the product being pumped.

2. **Lubricated single seal.**—This type utilizes only a single set of seal faces. Lubrication is effected through drilled openings in one of the running faces through which oil is pumped under pressure. This type requires auxiliary equipment which also includes a lubricating oil pump, oil reservoir, and the necessary piping. A lost-oil system is usually employed and therefore no cooling of the lubricating oil is required.

3. **Single, unlubricated, partially balanced seal.**—This seal also utilizes only a single set of faces. The proper proportioning of face areas provides a partial balance in face pressures which permits a carbon face to run against a tough metal face without the need for auxiliary equipment for lubrication or cooling. No control connection or adjustments by operating personnel are required for varying pumping pressures.

From correlated test information on the three types of seals, it was concluded that a single seal of the unlubricated and uncooled type is desired for products-pipe-line service. The double oil seal and the lubricated single seal, therefore, were eliminated. Work was concentrated on the single unlubricated partially balanced seal with the hopes of developing it into a high-pressure seal which would fulfill the requirements of the program. While some slight leakage is necessary on this type of seal for self-lubrication of the faces, it was felt that this would present no problem. Normal leakage is on the order of 12 to 15 drops per minute on fuels.

For gasoline and lighter products, leakage is less than the evaporation rate and, consequently, no visible leakage is observed. Proper cooling is accomplished by placing the seal faces well into the product. Throat bushings are removed to allow adequate product circulation at the seal faces for heat dissipation. In initial

*Plantation Pipe Line Co. Summary of paper presented at A.P.I. products pipe-line technology conference, St. Louis.

tests of the single, partially balanced seal the observations were:

1. **Simplicity of operation.** — There are neither water, oil, nor control connections to the seal and no auxiliary equipment required. No adjustments are required by operating personnel. Seals are unaffected by changes in pressure. No heat is generated in the stuffing box.

2. **Reduction in pump parts and pump bleeds.** — Throat bushings and shaft sleeves are removed; stuffing-box bleeds are plugged.

3. **Saving in power.** — Breakaway torque is reduced to a minimum. Power required at full speed is less than 1 hp. per pump.

4. **Ease of installation.** — During a pump assembly, the seals are installed in less time than that required to assemble packing sleeves. The design of one seal incorporates an extension sleeve and collar for external spring adjustment. This arrangement makes a one-piece assembly which can be installed or removed from a pump stuffing box without opening the pump case.

5. **Reduction in evaporation losses.** —The elimination of practically all leakage reduces the repumping of product into the main line to a minimum. Station efficiency is increased slightly by the elimination of recycling of product through the pump.

6. **Failures.**—Breakdowns have all been gradual, giving as much as several weeks' warning. Pumps have been operated without difficulty until a normal shutdown is scheduled. The repair is made during this period without loss in throughput.

This type of seal requires precision manufacturing. Close tolerances and finishes are necessary for satisfactory results. Seal face flatness must be within three light bands or less when measured with an optical flat. All stationary gaskets using O-rings must be finished to 20 microinches r.m.s. (maximum).

The first efforts in this development program were to check production seals of the single, unlubricated, partially balanced type. This investigation met with no success for the required shaft diameters, rotating speeds, pressures, and products to be handled. The next phase involved the testing of experimental seals furnished by seven seal and pump manufacturers. In early tests at the experimental station, varied degrees of success were obtained.

Sufficient indications were obtained to continue work on the development of a single seal. In the next 2 years, five seals were developed sufficiently to pass the requirements of the experimental station for installation of the seals in main-line pumps. To pass these requirements a seal must operate satisfactorily for a minimum of 500 hours on liquid propane at all pressures up to 850-1,000 psi.

Development work during this period involved the determination of face pressures, face widths, flatness, surface finishes, and materials. Each of these factors must be considered and properly proportioned in order to seal liquefied petroleum gases effectively.

Face pressures and face widths must be considered after the face materials have been selected. Each combination of metal and carbon has a particular face pressure and width in order to obtain a satisfactory L.P.G. seal and long life. Wider faces require higher face pressures and are therefore not as sensitive to the tolerances encountered in manufacture.

As mentioned above, the flatness and surface finish of the seal faces must be accurately controlled and inspected, otherwise there is a definite reduction in the service life of these parts. Mechanical lapping machines for finishing and optical flats for inspection are available. It is practical, therefore, to specify a flatness of three light bands and a finish of at least 10 microinches.

Since the stationary and the rotating faces must be perpendicular to the axis of rotation, flexibility of these parts is a necessary factor. Movement of the spring-loaded member along the pump shaft axis is required to compensate for wear of the seal faces and slight misalignment. To facilitate assembly and to assure alignment, the end plate or gland cover should make direct contact with the pump case.

For stationary seals in high-pressure mechanical seals, the O-ring is almost universally used. This type of stationary seal has given excellent performance except where the synthetic rubber moves over metal. When this occurs, the life of the O-ring is materially extended by smoother metal finishes and smaller clearances.

The next phase in the development of mechanical seals consisted of installing the successful seals in main-line pumps to determine service life. A typical seal of the type installed in the main line is shown in Fig. 1. In this phase, a great deal of success was attained in that the life of the seal faces met and exceeded the minimum life estimated for a reasonable payout. For example, faces in actual operational use for 8,000 to 10,000 hours show no appreciable wear and no indication of failure. If excessive leakage occurs, these faces can usually be relapped and put back into service.

Failures that have occurred have given sufficient warning to schedule normal down time in order that repairs can be made. In one instance, a seal operated for 6 weeks before repair after failure was indicated by excessive leakage. This excessive leakage is usually not greater than the normal leakage experienced with conventional packing. In another case, leakage developed for a 50-hour operating period, then sealed off and operated satisfactorily for an additional 6,000 hours. This difficulty was attributed to some dirt on the faces. In still another instance, a seal with 3,000 hours' operation was checked with a monochromatic light and optical flat and the faces were found to be within three light bands in flatness.

All seal failures have been mechanical in nature. These failures experienced result from:

1. Loss of flexibility of spring-loaded member.
2. Failure of drive pins or keys.
3. Swelling of rubber pads resulting in misalignment of seal faces.
4. Failure of O-ring stationary seal resulting from movement over metal.

In each case the failure has been amply preceded by a warning leakage. The failing seals have continued to operate until repair could be made without a loss in throughput.

The materials and configurations of mechanical seals developed under this program have demonstrated that a satisfactory solution to this problem has been reached. All test seals that have been installed in the main line have met the minimum requirements set up by the operations department for service life and have been considered operational. Several seals have exceeded 10,000 hours of trouble-free operation. Future plans are to equip all present pumps and new pumps with mechanical seals designed in accordance with Plantation's specifications.

Processes for Removal of Hydrogen Sulfide

(Continued from page 52)

amine acid solutions. Nevertheless, the process was used extensively before the war in Germany with about 1,000,000 cu. ft. per day of hydrogen sulfide was being removed and about 30,000 metric tons of sulfur recovered annually.

Phenolate process. — This process used a solution of sodium phenolate in a flow scheme similar to the others. Several operating difficulties were encountered in the few plants that were erected and the majority of them were converted to other processes.

Removal of H_2S in Presence of CO_2

As most of the processes for removing hydrogen sulfide from industrial gases are based on the acidic nature of hydrogen sulfide it is understandable that carbon dioxide, another acidic gas, will be removed as well. In some cases this is desirable, but in general it would be more economical not to remove the carbon dioxide. Therefore, it is frequently advantageous to use a process that will remove hydrogen sulfide selectively. The choice of such a process will depend largely on the type of

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gas to be treated, particularly with respect to the other impurities and constituents present.

We have pointed out before that two methods are used for the final purifications of carbon dioxide gases prior to liquefaction and dry-ice production. The treating agents used are potassium permanganate and bichromate-zinc sulfate. Both of them are nonregenerative solutions which are discarded when spent. These are highly selective processes, but are not economical except for removing very small quantities of hydrogen sulfide.

The processes generally used for purifying natural and refinery gases can be made selective to some extent by proper choice of solution and contact time. Here selectivity is generally due to a faster rate of reaction or solution of hydrogen sulfide as against carbon dioxide.

In the Girbotol process selectivity is accomplished by the use of a tertiary amine, such as triethanolamine, which reacts more readily with hydrogen sulfide. Bottoms has shown that carbon dioxide cannot react directly with the tertiary amine, but must be absorbed in water first as carbonic acid. Hydrogen sulfide therefore reacts more rapidly as it will combine directly. Complete removal of hydrogen sulfide without the absorption of some carbon dioxide cannot be accomplished in the general case. However, the majority of the carbon dioxide will remain in the treated gas.

As discussed previously the Alkazid "Dik" solution was developed for the selective removal of hydrogen sulfide in the presence of CO_2. This effect here is also due to a teritary amine group.

The phosphate process also attains selectivity due to a faster reaction rate with hydrogen sulfide. Due to the relatively short period of contact time encountered in commercial operation, hydrogen sulfide is preferentially absorbed, and gases containing a ratio of 10 or 15 to 1, carbon dioxide to hydrogen sulfide may be treated economically for hydrogen sulfide removal. At a 10 to 1 ratio, for example, the hydrogen sulfide concentration in the recovered acid gas will be about 35 per cent. Thus, this process will not remove hydrogen sulfide to the exclusion of carbon dioxide, but is preferential to a certain extent.

The importance of this selectivity varies considerably with the application and is closely tied in with the economics involved. It is conceivable that in some instances more savings would result in total removal of both hydrogen sulfide and carbon dioxide than in attempting hydrogen sulfide removal alone. In general, however, if carbon dioxide removal is not desired it is feasible to employ a preferential process for hydrogen sulfide removal.

Girbotol Operations

Since the Girbotol process has become the most widely used of the above described processes, it may prove helpful to cite some of the operating difficulties which have been encountered and their solution.

1. **Foaming.**—Due to the presence of various impurities in gas streams, foaming of the amine solution has been encountered. Foaming results in improper purification of the gas and execessive loss of amine solution. This can be corrected by the addition of small amount of "Ocenol" (oleyl alcohol), a surface-active agent which has been found by Girdler to be very effective.

2. **Loss of monoethanolamine due to presence of oxygen.**—When oxygen is present in the gas stream which also contains hydrogen sulfide, the latter is oxidized to thiosulfuric acid. Thiosulfuric acid reacts with the monoethanolamine to form an amine thiosulfate which cannot be decomposed in the reactivation. As a result, on continual exposure to a gas stream containing oxygen the amine becomes unavailable for reacting with hydrogen sulfide and improper purification results. This can be remedied by the addition of a sufficient amount of soda ash to neutralize the thiosulfate, forming sodium thiosulfate and freeing the amine. The mixture is separated by the use of a side-stream redistillation unit in which the free amine is recovered from the overhead vapors and the sodium thiosulfate is removed as a sludge.

3. **Corrosion.** — This has been the most serious problem encountered in the Girbotol process. In general very little corrosion has resulted in the purification of gas containing only hydrogen sulfide as an impurity. However, where a combination of carbon dioxide and hydrogen sulfide exists, corrosion has been severe in some cases. Girdler has had extensive research in progress on this problem.

Corrosion can be controlled where it results from a combination of oxygen and hydrogen sulfide and from pure carbon dioxide. Work is still in progress in preventing the corrosion found where a mixture of hydrogen sulfide and carbon dioxide exists. It has been found that excessively high temperatures in the reactivation can speed up this corrosion as well as improper stripping of the acid gases from the amine. Where those corrections fail to retard corrosion, it is necessary to resort to corrosion resistant materials.

Summary

The importance of hydrogen sulfide removal from industrial gases has been discussed and a review of the various processes for this purpose presented. Several types of processes are available depending on the use desired. The only dry process in wide use employs iron oxide. The wet processes have been classified according to the type of process. A brief description of all these processes has been included. Finally we have discussed processes suited to the selective removal of hydrogen sulfide in the presence of carbon dioxide.

We wish to acknowledge the assistance given by H. A. Gollmar of Koppers Co. and B. A. Frolov of Shell Development Co. in supplying information for this paper.

BOOKS

McDONALD AND ADJACENT OIL FIELDS, Allegheny and Washington counties, Pennsylvania. By A. I. Ingham, E. M. Tignor, and W. M. Nabors. Published by Pennsylvania Department of Internal Affairs, Harrisburg. $2.

One of the prime objects in undertaking this investigation was to assemble geologic data pertinent to the secondary recovery of oil. Another object is to obtain clearer ideas concerning the geological factors relating to the accumulation and occurrence of oil and gas.

SUMMARIZED RECORD OF DEEP WELLS IN PENNSYLVANIA. By Charles R. Fettke. Published by Pennsylvania Department of Internal Affairs, Harrisburg. 148 pp. 25 cents.

This report presents some of the more pertinent data relating to deep-sand exploration in Pennsylvania. These data have been collected during the past 25 years in connection with subsurface stratigraphic studies. In Pennsylvania, wells drilled to the Onandaga or deeper are known as deep wells to distinguish them from those that stop in upper Devonian or higher strata.

PETROLEUM COMMITTEE GENERAL REPORT. Published by International Labor Office, Washington Branch, 1825 Jefferson Place, N.W., Washington, D. C. 75 pp.

The first chapter of this booklet reviews the action taken on the conclusions adopted by the committee at its second session. These resolutions have to do with general basic education, recruitment, vocational training and apprenticeship, safety measures, hours of work, and rest periods. The second chapter reviews recent events and developments in world demand and world supply in the various oil-producing countries of the world.

SUBSURFACE PROJECTION OF CAMBRO-ORDOVICIAN SEDIMENTS IN THE PENNSYLVANIA - NEW YORK REGION. By Frank M. Swartz. Published by the Pennsylvania Department of Internal Affairs. 25 cents.

Prospective further decline in oil and gas production from the Devonian and Carboniferous sands that have afforded the supplies so far discovered in Pennsylvania, lends increased importance to possibilities of geologically older horizons despite their greater depths and lack of production in the few wells that have so far reached them in the state.

SOCIAL CONDITIONS IN THE PETROLEUM INDUSTRY. Published by the International Labor Office, Geneva.

The Petroleum Committee of the International Labor Organization, at its second session (Geneva, November 1948) adopted a resolution concerning social problems in the petroleum industry and inviting the governing body to instruct the office to study the social problems of the petroleum industry, with special reference to social services to petroleum workers, such as housing, health, sports, education, and any others necessary to safeguard good conditions in the oil fields and refineries. This little volume is the result.

Fig. 1—Key-slotted strainer opening with inserted key stud.

Inserted Key-Stud Strainer

New strainer has slots of minimum width formed by inserting preformed studs in milled broad openings in standard casing

by C. H. Biedendieck*

SAND-FREE oil production from unconsolidated sands without significant reduction of flowing pressure is of great concern to many production engineers. Many efforts have been made to construct effective filter slots suitable for more or less general demands. Marked eroding effects on deep-well pumps, and on well materials and gathering lines can result if operation of strainers is ineffective.

Theoretical considerations as well as practical experience in oil fields have determined the fundamental requirements for liner filters. Qualities of applied materials as well as permissible cost limit the approach to ideal construction. Hardness of filter walls is of greatest influence on fabrication cost of small-width slots. The steel walls of standard casing may be cut mechanically with regular tools, at increasing cost, down to a width of 0.3 mm. Due to the tubular form of casing the milling of undercut slots is far more difficult and is at present possible only down to 1.0-mm. width, being limited by the diameter of the strainer.

Undercut key-formed slots are therefore fabricated in small ranges by special devices. Various strainers are constructed in which a large-slotted pipe supports wrapped profiled wires, preformed rings, filter gauze, or coaxial attached profiled bars. These and similar constructions have disadvantages in that they may be damaged more or less during installation in deep or crooked wells, are more difficult to wash, and require more material and labor than strainer with slots cut in the liner pipe. The button-screen strainer is an example of a liner capable of being cleaned easily.

The author has developed a strainer with slots of minimum width formed by inserting studs in milled broad openings in standard casing. To get key-formed slots the studs are preformed. A photograph of a partly cut key slot is shown in Fig. 1. Any slot width may be formed by varying the thickness of the inserted studs.

For fabrication, a milling machine with one or more cutters is required. Studs of desired length and form may be stamped at small cost and are secured in position by welding or caulking. For oil-field installation slots of 5-mm. width and 50-mm. length have been milled by a semi-automatic milling machine in eight rows in a 4¾-in. casing. The openings have been ranged in vertically standard patterns. Milling of slots of that width is not expensive because there is less wear on cutting tools; one saw will cut up to 800 slots.

Fig. 2 shows how a "keyformed" stud is centrally inserted to form two key slots. By using different preformed studs two slots of variously desired forms may be obtained. By forming key slots the least restriction results. To get additional slots there must be inserted two or more studs (Fig. 3). If one wishes to build up a drillable liner with walls of lesser hardness there may be inserted two studs of high wear resistance which will become key-formed only at their touching sides (Fig. 4). In this way a suitable liner is provided for wells with high allowables in oil production. A strainer with horizontally milled openings is

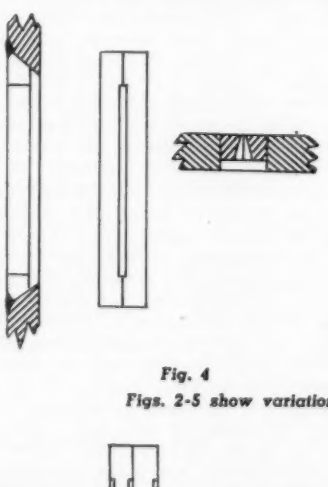


Fig. 4

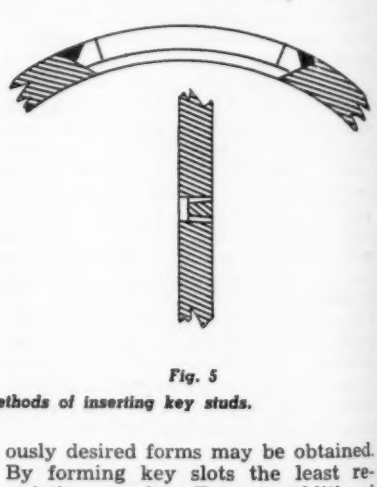


Fig. 5

Figs. 2-5 show variations in methods of inserting key studs.

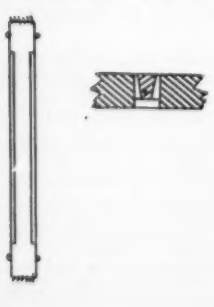


Fig. 2

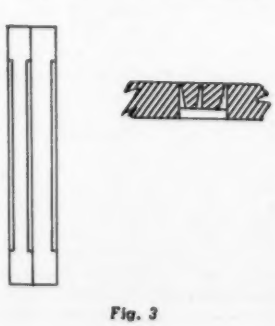


Fig. 3

*Bentheim (23), Germany.

obtained by using curved studs (Fig. 5). The strength of these stud strainers correspond to that of standard full-gaged slotted strainers and no additional precautionary measures are necessary in handling the stud strainers during transport and lowering to bottom of well.

Variation in the width of filter slots is obtained by using studs with different head thickness and varying the width of milled opening in the casing wall. Concentric position of studs is obtained by use of spacers or by reinforcements at the ends and also in the middle of long studs. Attachment may be made by point welding (automatic) or by chisel.

In this manner it is possible to form small slots with any degree of undercut in standard casing which is not possible by other methods. The operations of milling openings with a tall saw and of forming studs by forging, rollings, or cutting are easy to control while fabricating extra-fine-gage key slots for optimum performance. The strainer with finest key-stud slots of less than 0.1 mm. width will be not more expensive than a strainer with a key-stud slot width of 0.5 mm. and more.

Strainers of 4¾-in. size which have been build by this method had 200 slots per meter. With slots of 0.4-mm. width and 40-mm. length the total area of opening is 32 sq. cm. The installed liners had an over-all perforated length of 30 m. average.

The slot width has been fixed at 0.3-0.5 mm. as the maximum allowable related to a 0.15-0.25-mm. diameter of grains at the 10 per cent point of the screening curve. The monthly production peak through a stud strainer in a pumping well has been 1,000 meter-tons (approximately 9,000 bbl.) of a viscous crude with extremely high paraffin and wax content. Through bottom-hole measurements in oil wells no pressure reduction caused by filter resistance could be detected.

Following round trips in pulling tubing occasioned by paraffin deposits there have been observed, at times, sand intrusions through the strainer, existing only in the first 24 hours after the trip. It is supposed that the sand bridges over the slots are partially disturbed by pressure variation effects during the round trip and that sand may rush inside the liner. When oil flow is in progress, the grain bridges are soon built up again. The sand that rushes in cleans the slots and surroundings of paraffin deposits. This is an effect valuable in low-pressure fields.

The key-stud strainer has been employed in the field in many pumping wells and for periods of over a year. Some wells have first been fitted with a conventional large perforated strainer (slot width of 1 to 4 mm.) and later on with inserted-stud liners with slots of 0.2 up to 0.5 mm. These wells show improvements obtained by the fine-gaged key-stud strainers where sand trouble is encountered. Increase in oil production and reduction in cost for material and labor is obtained with the inserted stud strainer.

Portilla Field

(Continued from page 56)

Diesel Rigs

Parker Drilling Co. has drilled seven wells at Portilla for Superior. The contractor utilizes a National 100 rig, driven from three 350-hp. Waukesha diesel engines.

Derricks.—Standard 136-ft. steel derricks are used with a 30 by 30-ft. base, equipped with 10-ft. substructure.

Blowout preventers.—Three hydraulic-controlled blowout preventers are rigged up in the basement. All are made up on the 10¾ or 11¾-in. surface pipe. One 13⅜-in. unit is provided with an adapter for this size surface casing.

Straight-hole precautions.—Parker uses two drill collars for shallow depths. When a depth of about 4,000 ft. is reached, three additional drill collars are added.

Stringing lines.—When rigging up, Parker uses six lines, but changes over to eight lines when setting the long string.

Hole size.—A 12¼-in. hole is cut to 1,225 ft. where the 10¾ or 11¾-in. surface pipe is set. At this point, the hole is reduced to 9⅞ in. From 15 to 20 rock bits are required to drill a well at Portilla, depending upon contract depth.

The only major drilling problems encountered in this field are high-pressure gas sands found at about 9,000 ft. This would lie about 500 to 600 ft. below the lowest producing oil reservoir.

Days to drill.—Parker Drilling Co. has cut 7,936 ft. of hole in only 23 days (including rigging up and surface-pipe-setting time). In the experience of this contractor, days to drill will vary from 23 to 28 days. Only 30 hours is consumed in skidding over to a new location, rigging up, and making hole.

Mud practice

Water-base mud is used in all wells drilled for Superior in this field. The initial mud weight is 9.9 lb. per gallon with a viscosity of 38 seconds A.P.I. The following table of mud weights and viscosities is typical of mud-control practice followed in this field.

Depth—	Mud weight (lb./gal.)	Viscosity, sec. A.P.I.
Surface	9.9	38
4,700 ft.	10.2	42
6,800 ft.	10.9	47
7,000 ft.	11.4	49
7,300 ft.	11.6	47
7,900 ft.	11.6	51

During the early developments of Portilla field, Superior set 11¾-in. at depths ranging from 1,620 to 1,663 ft. Subsequent completions called for setting 10¾-in. pipe at depths averaging only 1,220 ft. However, some 11¾-in. pipe is still being used for setting the short string. About 750 sacks of cement are placed behind the pipe.

Long string.—Open hole is carried to contract depth, the long string set on bottom, and cemented with 500 sacks. Seven-inch pipe has been used in all completions except at Plymouth Oil Corp. G-1 R. H. Welder. In this case, 5½-in. pipe was set in completing a gas-condensate discovery in the 7,000-ft. reservoir. While waiting on cement to set, the pipe is raised and lowered 2 ft. to assure a good cement job.

Deviation surveys.—Contractors are held to a 2° maximum deviation and required to run deviation surveys every 200 ft. Contractor furnishes surveying equipment.

PORTILLA FIELD—SUMMARY OF WELL COMPLETIONS
(Status as of December 15, 1950)

Oil wells	19
Gas-condensate wells	1
Dry holes	*0
Total	20

*Dry holes shown on field map are shallow and did not reach the present producing Frio sand reservoirs.

Toughest Drilling Location

(Continued from page 43)

Bridge's work where feasible. It was necessary for the road contractors to wait for the first three portable bridges to be installed before proceeding.

As a matter of interest, the state highway was completely under water twice immediately prior to the access road construction. (The drill site was 3 ft. below highway level.) Once the access road was completed, a hurricane in the Gulf of Mexico delayed moving in the drilling equipment for several days. Once the equipment was moved in, actual drilling time on the 8,000-ft. wildcat was 2 weeks.

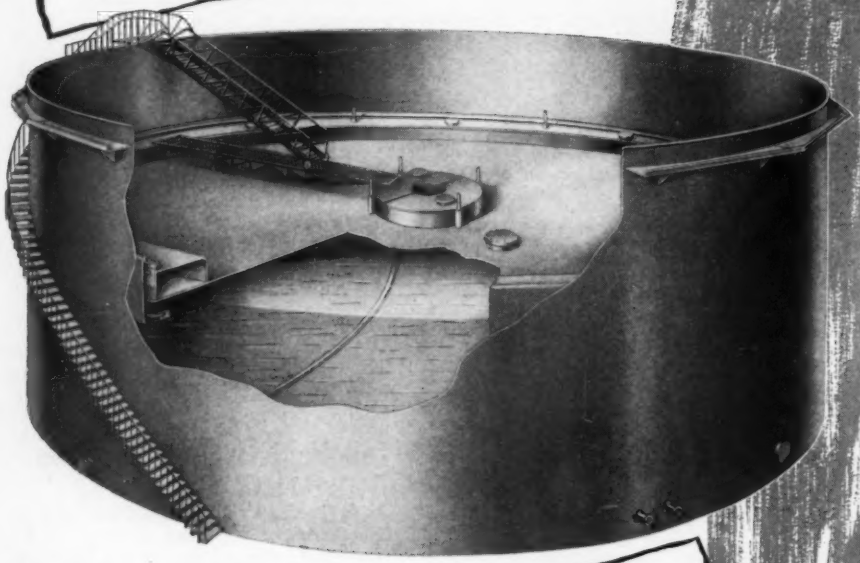
Total elapsed time for the entire venture—building the access road, moving in drilling equipment, drilling the well, and tearing down—was 30 days.

There were no heavy rains during the 30 days of activity, so the well was drilled with no difficulties from water. As a precaution, a 6-ft. earthen dike was thrown up around the drilling rig. This was sufficiently high to protect the equipment from anything but a major flood.

Houston Oil engineers feel that the use of steel treadway and portable bridges made an economically feasible project out of an uneconomical one. Without the use of the steel treadway, it would have been necessary to extensively reinforce the state-highway bridges to raise their rating from 10 to 45 tons. This would have been an expensive undertaking.

Since the wildcat proved to be dry, the use of portable bridges was a very considerable saving. The company spent only rental money instead of a greater sum which would have been necessary for permanent bridges. Also, it is doubtful if permanent-type bridges could have been erected within the 60-day time limit.

NOW . . .



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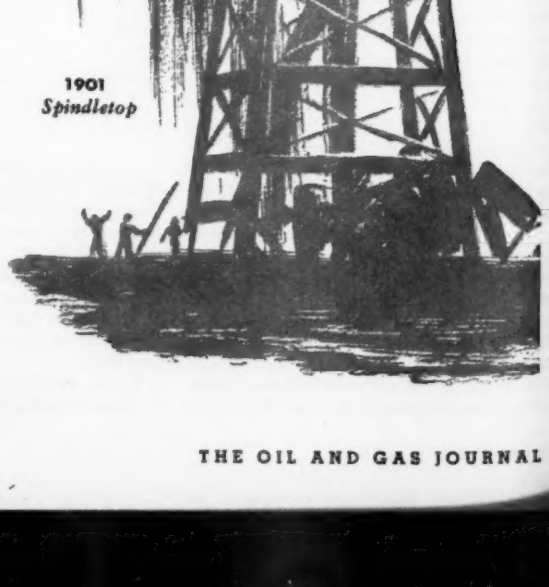

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Vanadium in Crude Oils—5 Effect on Steels or Alloys

Note: This is a continuation of discussions which have appeared in four issues in answer to the questions stated in the issue of November 30, 1950, and it completes all of the information available at this time.

There are quite a few cases on record of a dense fused slag on superheater tubes of boilers and when this occurs analyses have usually shown a high content of vanadium pentoxide with lesser amounts of chromium and nickel oxides. Accumulation occurs where gas and metal temperatures are high, (gas 1,800° F., metal 850° F.). The slag cannot ordinarily be controlled by conventional soot blowers, but in a number of instances has been kept under control by high-pressure retractable soot blowers. There have been some indications of corrosion in the power plant of one large utility operator, but this is not generally substantiated. By memory, a hard dense slag thought to contain 40 per cent of V_2O_5, was said to have etched or grooved the metal as it drained from the surface.

There is little evidence of slag on steam-generating tubes where metal temperatures are of the order of 600° F. or less. This is true with respect to both water wall and screen tubes where gas temperatures are higher than in the superheater, and in rear boiler passes and economizers where they are considerably lower.

Solids do accumulate in the colder areas, but they are not fused and usually can be readily controlled by conventional soot blowers. Their composition is quite different from the fused slag, being much lower in vanadium, chromium, and nickel, and higher in sodium, iron, and sulfates.

In air heaters, gas temperatures are reduced to 300° F. or lower, and metal temperatures in contact with cold incoming air may be as low as 150° to 175° F. This is cold enough to condense SO_3 from the gas. The SO_3 is hygroscopic and absorbs moisture causing the dry solids to adhere to the moist surface. This causes plugging of the passages and severe corrosion. Vanadium is an active catalyst for the oxidation of SO_2 and SO_3 and this acidic material may saturate the corrosion debris increasing both corrosion and plugging rates. This can be overcome only by recirculating heated air or by bypassing some of the cold air around the preheater, which results in higher gas temperatures with a consequent loss in efficiency. A sacrifice of from 1 to 2 per cent may be necessary in order to eliminate the difficulties.

Spacers of high chrome nickel alloy (28-12) are employed in boilers to keep superheater tubes in proper relative position. These are subject to high gas temperatures (1,800 °F.+) and are not cooled. At such temperatures, vanadium appears to fuse with the spacer material destroying it in a short time. The same thing has occurred with tube supports in oil heating furnaces. One analysis of the product of "corrosion" of tube supports showed 30 per cent V, 5 per cent Cr., 9 per cent Ni.

Some authorities suspect that vanadium may extract chromium and nickel from alloys containing these metals. It is true that these three metals are usually found in the fused slag and that all high-pressure superheater tubes are of chrome-nickel alloys. Little information is available as to the presence of chromium and nickel in vanadium-bearing crudes but it is known that Boscan, Venezuela, and Santa Maria, California, crudes contain appreciable proportions of nickel. Likewise, it is known that California crude oils usually contain more nickel than vanadium. Tubes in the Mercury boiler installation at Hartford, Conn., contain 5 per cent Cr., 1 per cent Mo., ½ per cent Si., and 0.0 per cent Ni., yet analyses of a number of deposits from different parts of the boiler all showed the presence of chromium and nickel. Such a situation can be explained only by extraction of chromium from the tube material, and nickel from the fuel.

Difficulty With Asphaltic Crudes

One refiner in California has reported difficulty with asphaltic crudes due to deposits of V_2O_5 on furnace tubes. This refiner observed a decrease in thermal efficiency of about 1½ per cent due to the insulating effect of the ash deposits. Vacuum-type cleaning equipment was not found to be practical because in the presence of the chlorides of magnesium and calcium (from salt in the crude oil) the V_2O_5 forms a glaze on the surface of the tubes. Upon cooling, the hygroscopic glaze absorbs water and sticks to the tubes. Spraying of the tubes with water, without completely shutting down the still, resulted in a greater loss in efficiency than caused by the insulating effect of the deposit. It was found that the deposit could be easily "hosed off' during regular shutdown periods.

Laboratory-scale experiments of Richard M. Berry at Ohio State University are described by Fontana[1,2]. Vanadium, molybdenum, or tungsten oxides greatly hasten the rate of oxidation or corrosion of steels or alloys that contain these same elements when maintained at temperatures of 1,650° F. or higher. Stainless steel (type 410—12 per cent chromium) containing no vanadium was little affected by vanadium oxide, plain carbon steel was affected somewhat, but a chrome vanadium steel (7.89 Cr.; 2.06 Va.; etc.) was vigorously attacked (10 times as fast as the plain carbon steel) when exposed at 1,650° F. for 19 to 29 hours.

Samples were also exposed in crucibles to molten vanadium oxide at 1,320° F. At the liquid line, corrosion proceeded so rapidly that a notch was produced in the metal specimens after only a few hours of exposure. The corrosion is thought to be mainly oxidation because air must be present. However, in furnace experiments, even a slight movement of air prevented rapid oxidation, air movement resulting in a more normal type of corrosion.

Much the same type of corrosion appears to occur when molybdenum bearing alloys are exposed to MoO_3 at high temperatures.

References

1. Mars G. Fontana, Corrosion, Ind. Eng. Chem. pg. 65A, Oct. 1950.
2. Mars G. Fontana, Corrosion, Ind. Eng. Chem, June 1948.
3. Brasunas and Grant, Iron Age 166, 85-90, Aug. 17, 1950.

Effect of Pressure On Liquids

Is there information about the effect of high pressures such as 1,000-1,500 psi. on the viscosity of materials handled in products pipe lines, such as kerosine, distillates, or diesel fuels?. F. C.

Experimental data on the effect of pressure on liquids is scant because at lower pressures (500 psi. and under) the effect is small. Perhaps the best organized data are those published in Chemical Engineering Principles by Hougen and Watson (John Wiley & Sons, New York) and also shown in Petroleum Refinery Engineering, Third Edition (McGraw-Hill Book Co., Inc., New York, 1949). In addition, Dow, Fenske, and Morgan (Ind. Eng. Chem., Vol. 29, p. 1078, 1937) indicate an increase in viscosity of about 15 per cent at 1,000 psi., and even 300 to 800 per cent at 10,000 psi.

However, the experimental data mentioned above apply primarily to room temperatures or higher temperatures. Accordingly, viscosities were computed at several temperatures and pressures for the following two oils

so that values at 0° F. could be estimated with confidence.

	A.P.I.	°F.
Kerosine	42.5	350-500
Gas oil	35.0	450-650

The results are shown in Table 1.

It is evident from Table 1 that reduction of temperature decreases the effect of pressure on the viscosity and at very low temperatures (below zero), the effect of pressure becomes almost independent of temperature.

It might have been expected that the viscosity of the kerosine would be affected more by pressure than the gas oil. Such is the case at pressures below the critical pressure (240 and 310 psi. for these two materials), but at high pressures the reverse occurs with these materials because the critical pressure of the kerosine is higher than that of the gas oil. In other words, the increase in viscosity is related to the ratio of the actual pressure to the critical pressure and thus for example, a pressure of 1,000 psi. is smaller with respect to 310 psi. (the critical pressure of the kerosine) than it is with respect to 240 psi.

The figures given here are not precise but it is felt that they represent the right magnitude of the effect of pressure.

Similar information as that given herein, but for these same two materials when in the vapor state, were published in The Refiner's Notebook of February 12, 1948, in The Oil and Gas Journal.

TABLE 1—PERCENTAGE INCREASE IN VISCOSITY WITH PRESSURE

(Based on viscosity at atmospheric pressure)

Temp.,	Gas oil (psi.)					Kerosine (psi.)				
°F.	500	1,000	1,500	2,000	2,500	500	1,000	1,500	2,000	2,500
600	5.3	17.7	31.0	46.3	62.0	....	....	....	....	....
500	4.3	14.7	25.8	37.2	48.0	4.1	12.3	21.5	31.8	42.0
400	3.8	13.0	22.5	32.0	40.5	2.4	8.2	16.5	25.8	35.0
300	3.4	12.2	20.7	29.0	36.0	1.8	6.7	14.4	23.1	32.3
200	3.2	11.6	19.5	27.0	33.0	1.4	5.9	13.2	22.0	30.8
*100	3.0	11.1	18.7	25.2	31.0	1.2	5.4	12.7	21.7	30.0
*0	2.9	10.8	18.0	24.0	29.6	1.1	5.1	12.4	21.3	29.7

*Extrapolated.

Canadian Refinery Expansion

(Continued from page 46)

to produce motor fuel, solvent, and tractor-fuel components.

Kerosine and diesel-fuel side streams in the volumes required to meet varying seasonal demand will be withdrawn to storage. Kerosine passes to a hot bauxite treater and rerun tower before blending to tractor fuel and other products. The remaining kerosine and diesel-fuel fractions will comprise charging stock.

Heavy gas oil from the atmospheric tower and coker gas will make up the principal fresh feed for the fluid catalytic cracking unit, charging directly to the reactor. The cat unit, of orthoflow design, includes the conventional fractionator and light-ends-recovery section, the latter comprising an absorber, debutanizer, and depropanizer. Heavy gas oil from the fractionator recycles to the reactor.

The reduced crude fraction from the atmospheric unit represents total feed to the delayed coking unit. The residual stream returns to a separate section of the combination crude-coking furnace and charges directly to the onstream coking drum. The coking unit operates on single pass with no recycle.

Stream Integration

In the employment of thermal cracking and the flexible tiein of the three conversion processes, the new British American refinery will depart from usual design in plants of its size. The key vessel in the unit integration is a bubble tower which serves as a sort of clearing house for straightrun, cat cracked, and thermal cracked streams. The fractionator takes the thermal cracked effluents of both the thermal cracking furnace and the onstream coking drum. In addition, that excess straightrun kerosine and diesel fuel not required for direct product blending are charged to the light-gas-oil section of the tower. At the same time, the tower receives light cycle oil from the cat unit. These five streams combined in the tower are fractionated into four cuts.

Overhead products comprising cracked gasoline fractions from the thermal cracker and coker are stabilized and treated in a Linde copper-sweetening unit for blending to finished motor fuel. The light-gas-oil sidestream which includes components from all of the five streams feeding to the tower constitutes the feed stock for the thermal cracking heater. Heavy gas oil from the two thermal cracking operations is cycled together with the heavy cat cycle oil direct to the fluid catalytic reactor. The heavy tar bottoms from this combination tower are withdrawn from processing and blended off as heavy fuel product.

Normally, the thermal cracking unit will be operated at whatever throughput rate or degree of severity is required to balance over-all refinery operations. The straightrun kerosine and diesel-fuel streams may be diverted to the catalytic unit when desired. By diverting certain feed and recycle streams, either the fluid cat unit or the thermal cracking unit may be withdrawn from operation for individual turnarounds without disrupting over-all refinery operation.

The conversion process units are designed with sufficient capacity to permit this flexibility of operation. The catalytic cracking unit will normally process 1,665 to 2,000 bbl. of feed per stream day, but is capable of charging up to 3,500 bbl. per day. The thermal cracking unit is rated for a daily charge of 1,450 bbl. The delayed coking unit will handle 2,150 bbl. per stream day.

M. W. Kellogg Co. through its affiliate Canadian Kellogg, Ltd., is contractor for the design and construction of all process units in the new British American refinery. The fluid catalytic cracking unit of Kellogg design incorporates reactor and regenerator in a single integrated vessel. Offsite installations are being designed by British American's own engineering department with construction being carried out by W. M. Barnes Co. of Canada, Ltd.

Moose Jaw Expansion

At the Moose Jaw, Sask., refinery, British American is revamping existing crude units to increase capacity from 6,000 to 10,000 bbl. per day, combining atmospheric and vacuum distillation. A thermal cracking unit capable of processing 1,500 bbl. per day of light gas oil is being added.

Vacuum reduced crude will be charged to a new delayed coking unit capable of charging 2,500 bbl. of feed stock and producing 75 tons of coke per stream day. A new fluid catalytic cracking unit designed by Universal Oil Products Co. will process 4,500 bbl. of fresh feed per stream day. A new catalytic polymerization unit operating in conjunction with the fluid cat light-ends-recovery section will produce 500 bbl. of polymer per stream day.

New auxiliary facilities going into Moose Jaw include a new cooling-water system, additional tankage, a fire-protection system, and buildings to house shops and stores and laboratory facilities. Process Engineers, Inc., of Dallas, is the principal contractor for the Moose Jaw project. Work began last September and completion is scheduled for December 1951.

The largest refinery project now planned in Canada concerns a complete new 20,000-bbl. per day plant to be built by Canadian Oil Refineries at Froomfield, Ont., located near Sarnia. This $18,000,000 project will incorporate atmospheric and vacuum crude distillation, catalytic reforming, catalytic cracking, catalytic polymerization, gas desulfurization, and facilities for producing liquefied petroleum gases.

The new refinery will process Alberta crude. Stone & Webster Engineering Corp. has been selected as project manager. Design of the refinery is now in progress but has not yet reached the stage where all process units and auxiliary facilities have been selected. Construction is expected to begin in early 1951, and completion of the project is scheduled for April 1952.

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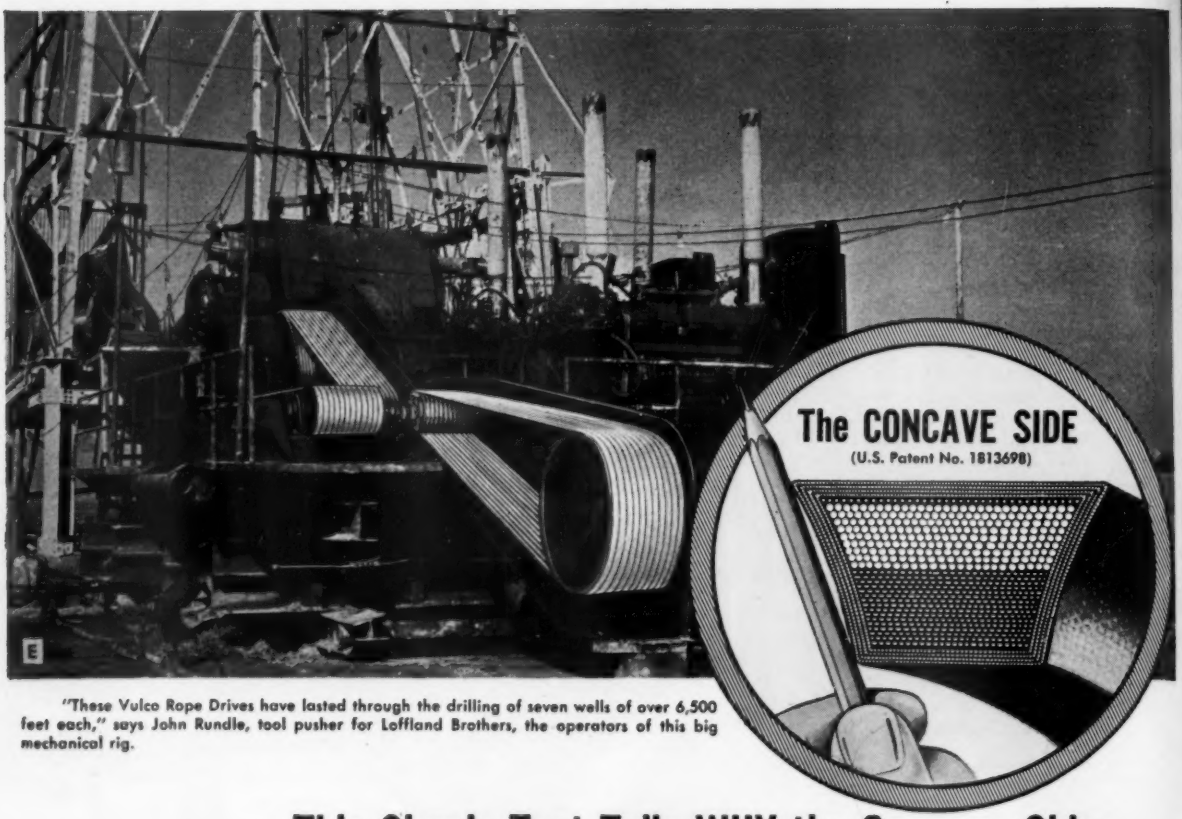

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Take any V-belt that has *straight* sides. *Bend* that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.

Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.

Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.

Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. There is no side-bulge. This belt, when bent, precisely fits its sheave groove.

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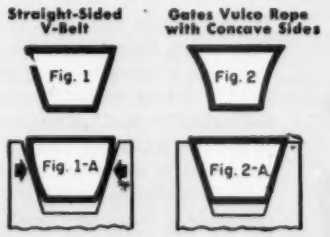
Only V-belts made by Gates are built with concave sides. Whenever you buy V-belts, be sure that you get the V-belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave-Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

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Cost-imating

Current Itemized Cost Indexes

THE indexes of specific construction materials shown on this page, prepared by W. L. Nelson, Journal technical editor, may be used to bring the many costs published in the Cost-imating series (The Oil and Gas Journal, October 21, 1948, and weekly through December 29, 1949) to current prices. Similar tabulations and cost indexes appear each quarter in the first weekly issues of the months of January, April, July, and October. In addition, the Refinery Construction Index appears each month (first weekly issue) on the Refining page of the Journal.

(May be used to bring the prices of the Cost-imating series to present prices)

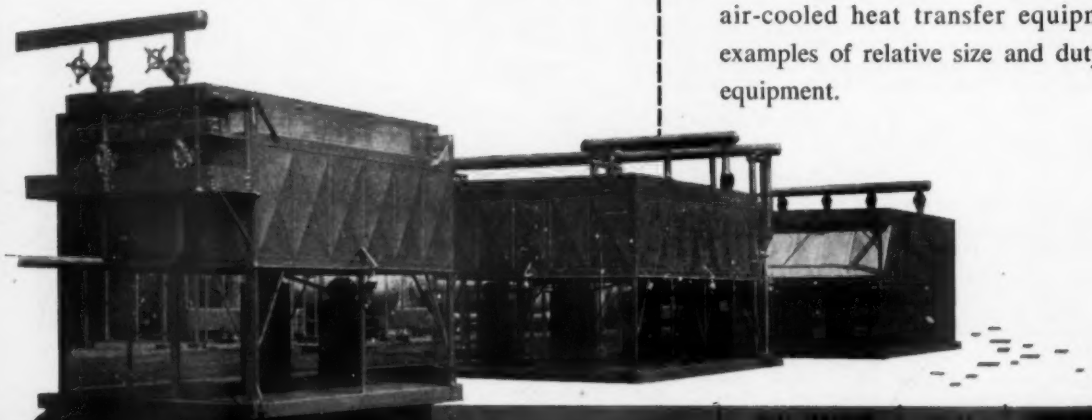
Indexes based on 1946 = 100

	1947	1948	1949	Sept. 1950	Reference*	Complete index appears in Cost-imating
Labor:						
Skilled construction	112.0	125.0	133.9	141.9	Eng. News Record	No. 55—Nov. 3, 1949
Common labor	115.0	131.0	140.4	150.9	Eng. News Record	No. 55—Nov. 3, 1949
Refinery construction	113.5	128.0	137.1	146.4		No. 61—Dec. 15, 1949
Refinery operation	109.0	126.0	132.9	†135.7	Survey of Current Business	No. 55—Nov. 3, 1949
Equipment or materials:						
Board, insulation, 48-in.	112.5	125.0	125.1	133.6	Code 561	
Boiler tubes, 2-2¼-in.	115.0	†135.0	140.9	148.1	Code 409.2	
Brick and tile composite	114.0	137.0	131.4	137.3	Composite	No. 22—Mar. 17, 1949
Brick, common	110.5	127.0	133.1	141.8	Code 498.1	
Brick, fireclay	114.0	126.0	131.3	141.3	Code 499	
Building materials composite	135.5	153.0	145.8	165.5	Composite	No. 22—Mar. 17, 1949
Castings, gray iron	118.5	†139.5	†141.5	169.3	Code 416.8	No. 46—Sept. 1, 1949
Castings, pipe	129.0	†180.0	173.8	171.2	Code 434.2	No. 46—Sept. 1, 1949
Cement	110.0	125.0	128.2	130.9	Code 509.1	No. 22—Mar. 17, 1949
Compressor	114.0	128.0	120.0	125.9	Manufacturer	No. 36—June 23, 1949
Engines (composite)	109.0	120.0	115.5	120.5	Manufacturer	No. 36—June 23, 1949
Gas	111.0	122.0	117.0	129.2	Manufacturer	No. 36—June 23, 1949
Diesel	108.0	117.0	114.0	111.8	Manufacturer	No. 36—June 23, 1949
Exchangers	†115.0	†130.0	†133.0	....		No. 2—Oct. 28, 1948
Instruments (composite)	113.0	120.0	123.1	133.8	Manufacturer	No. 34—June 9, 1949
Flow meter, mechanical	102.0	....	109.2	121.3	Manufacturer	No. 34—June 9, 1949
Flow meter, air control	....	....	132.4	146.8	Manufacturer	No. 34—June 9, 1949
Flow meter, remote	....	....	130.2	142.2	Manufacturer	No. 34—June 9, 1949
Potentiometer, 6-pt.	111.0	....	125.8	137.3	Manufacturer	No. 34—June 9, 1949
Potentiometer, air control	....	....	131.6	136.8	Manufacturer	No. 34—June 9, 1949
Pressure controller	....	....	130.2	146.2	Manufacturer	No. 34—June 9, 1949
Pressure gage	109.0	....	100.0	100.0	Manufacturer	No. 34—June 9, 1949
Thermometer, recording	....	....	118.6	129.6	Manufacturer	No. 34—June 9, 1949
Control valve	117.0	....	129.8	143.1	Manufacturer	No. 34—June 9, 1949
Insulation, asbestos pipe	118.0	122.0	130.1	130.3	Code 767	
Lumber (composite)	155.0	175.0	160.1	207.8	Composite	No. 7—Dec. 2, 1948
Cypress, C grade	155.0	178.0	213.5	251.5	Code 529-2	
Pine, Ponderoso, No. 3	140.0	176.0	159.0	199.0	Code 524-1	
Pine, yellow timbers	138.0	161.0	154.8	195.4	Code 522-9.1	No. 7—Dec. 2, 1948
Redwood, heart	134.0	†159.0	154.6	191.6	Code 528-3	
Motors, electric	110.0	112.7	114.0	135.3	Manufacturer	No. 31—May 19, 1949
Paint and paint materials	137.0	135.0	127.5	123.1	Composite	No. 22—Mar. 17, 1949
Paint, inside, flat	133.5	137.0	147.0	151.5	Code 531.1	
Paint, outside	150.0	†156.0	157.0	146.8	Code 532.1	
Pipe, sewer	111.5	121.5	119.1	135.8	Code 572.1	No. 22—Mar. 17, 1949
Pipe, black, ¾-in.	120.5	†148.0	152.2	159.0	Code 435.1	No. 42—Aug. 4, 1949
Pumps (composite)	118.7	129.1	131.7	144.0	Manufacturer	No. 29—May 5, 1949
Centrifugal	109.0	120.0	118.9	133.7	Manufacturer	
Reciprocating	128.5	138.1	144.6	154.4	Manufacturer	
Sand	112.0	122.0	127.4	135.9	Code 579.2	
Steel (composite iron and steel)	121.0	140.5	150.2	156.0	Composite	No. 61—Dec. 15, 1949
Plate (tank)	117.5	†144.0	144.5	151.1	Code 446.3	No. 5—Nov. 18, 1948
Sheet, galvanized	105.0	†146.0	139.0	154.8	Code 448.3	
Structural	113.5	†145.0	151.3	161.7	Code 452.2	No. 18—Feb. 17, 1949
Transformers	116.0	116.0	116.0	123.4	Manufacturer	No. 31—May 19, 1949
Marshall-Stevens equipment (only) indexes:						
Process industries (average)	121.0	131.5	131.5	137.3	Chem. Eng., Nov. 1950	Chem. Eng., Feb. 1950
Chemical	119.5	130.0	130.0	135.2	Chem. Eng., Nov. 1950	Chem. Eng., Feb. 1950
Petroleum	121.0	132.0	132.0	138.0	Chem. Eng., Nov. 1950	Chem. Eng., Feb. 1950
Electrical power	122.0	135.0	135.0	140.8	Chem. Eng., Nov. 1950	Chem. Eng., Feb. 1950
Refrigeration	129.0	141.0	139.9	151.8	Chem. Eng., Nov. 1950	Chem. Eng., Feb. 1950
Steam power	122.0	132.0	132.0	138.0	Chem. Eng., Nov. 1950	Chem. Eng., Feb. 1950
Nelson—Refinery Construction	117.0	132.5	139.6	149.1		No. 61—Dec. 15, 1949

*The reference for all codes, or for composite, is "Wholesale Prices," published monthly by the Bureau of Labor Statistics, U. S. Department of Commerce. †Estimate.

Here are 15 TYPICAL APPLICATIONS for FIN-FAN AIR-COOLED Heat Exchanger Equipment

For many years, Fin-Fan Air-Cooled Heat Exchangers have proved their worth by giving reliable, economical service in many and varied applications. The Fluor Corporation, Ltd., and Griscom-Russell Company, pioneer-partners in the air-cooled heat transfer field, offer the following to show the large variety of practical applications for air-cooled heat transfer equipment and examples of relative size and duty of such equipment.



SERVICE	(BTU/HR.)	H.P.	FACE
GAS COOLING			
Natural Gas After-Cooler	13,920,000	80	46′ x 25′
Manufactured Gas Cooler	11,165,000	50	23′ x 21′
Natural Gas After-Cooler	3,400,000	15	11′ x 21′
Natural Gas Inter-Cooler	7,890,000	40	23′ x 21′
VAPOR CONDENSING			
Reflux Condenser	18,407,000	90	48′ x 25′
Primary Condenser	4,652,000	40	11′ x 25′
Still O.H. Condenser	4,875,000	34	16′ x 21′
Debutanizer Condenser	11,930,000	60	23′ x 25′
Still Reflux Condenser	39,110,000	60	46′ x 25′
Steam Condenser	87,300,000	300	138′ x 31′
Steam Condenser	2,880,000	10	10′ x 6′
LIQUID COOLING			
Vegetable Oil Cooler	628,000	15	6′ x 17′
Absorption Oil Cooler	14,915,000	100	32′ x 17′
Quenching Oil Cooler	1,665,000	50	23′ x 25′
Amine Solution Cooler	19,300,000	175	38′ x 25′
Stabilized Crude Cooler	125,100,000	700	315′ x 25′
Jacket Water	2,400,000	5.5	16′ x 12′
Jacket Water	28,800,000	100	70′ x 24′

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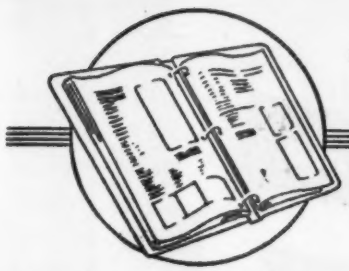

THE REFINER'S notebook

What Is Lubricating Grease?*

A QUICK definition of a lubricating grease, from the American Society for Testing Materials, is: ". . . a combination of a petroleum product, and a soap or mixture of soaps, suitable for certain lubrication applications." However, to understand what a grease really is, one must get down to the basic facts about the materials in it—the chemical characteristics of the atoms and molecules that compose these materials, together with their physical characteristics—and how all these affect its behavior.

Cohesion and adhesion of molecules and the nature of polar and nonpolar molecules is indicated by Figs. 3-7.

With current theories about "polar molecules" has come the possibility of answering many questions about greases. Only recently, references to "polarity" and "polar molecules" are beginning to appear more and more frequently in literature on the subject of lubrication. Such references are indicative of a cautious approach to what ultimately may prove to be the answer to the questions about "slipperiness"—and provide grounds for new and significant concepts in the fundamentals of lubrication.

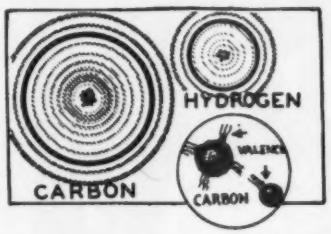

Fig. 1—Atoms are made up of a positively charged center or nucleus, surrounded by "shells" of negative electrons. The total positive and negative charges in an atom are equal, but vary in number among different kinds of atoms. This accounts for differences in their behavior. The arrangement of electrons in the outer shell largely governs the atom's ability to combine with other atoms.

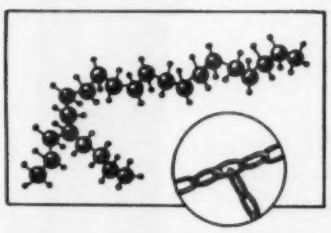

Fig. 2—Carbon atoms, with a valence of 4, have the ability to combine with other carbon atoms, as well as with different kinds of atoms. Thus carbon atoms can form chain or ring-like "skeletons," widely different in size. When the remaining valence bonds of the carbon atoms join with univalent hydrogen, the molecule is called a hydrocarbon, the basic molecule of petroleum.

*From material prepared by Shell Oil Co. on "Fundamentals of Lubricating Greases."

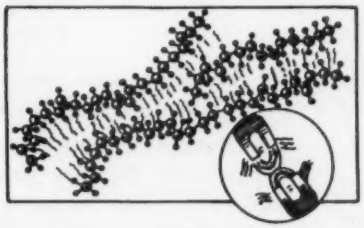

Fig. 3—Most molecules have a strong attraction for molecules like, or nearly like, themselves. This attraction is called cohesion, and may be visualized as similar to the attraction between two magnets. The strength of cohesive forces between molecules is dependent on the kind of molecules involved, and the temperature. Because of cohesive forces, liquids offer a resistance to flow, which is measured as viscosity.

Fig. 4—Another force possessed by molecules causes them to be attracted to those of an unlike kind. This force is called adhesion. Adhesion causes fluid films to adhere to and "wet" a dry surface. Since adhesive qualities of hydrocarbon molecules are comparatively weak, petroleum oils seldom stick to metals as tightly as we wish them to.

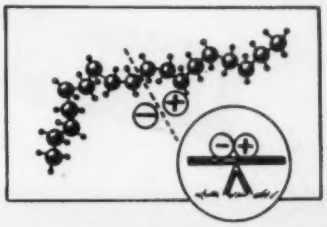

Fig. 5—The interior electrical forces of the atoms in a hydrocarbon molecule (as distinct from cohesive and adhesive forces) are so uniformly distributed that they have no exterior effect and the molecule is said to be in "electrical balance." The reason can be visualized by assuming the negative and positive forces neutralize each other throughout the molecule. Hydrocarbon molecules such as make up the bulk of ordinary petroleum oils are electrically "neutral" or "balanced" and are termed "nonpolar."

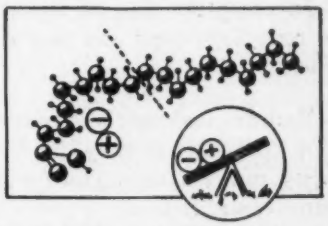

Fig. 6—A fatty-acid molecule (above) is identical in structure with a hydrocarbon molecule, except that two oxygen atoms and one hydrogen are attached to the end carbon. This "carboxyl group" upsets the electrical balance of the molecule and it becomes electrically active.

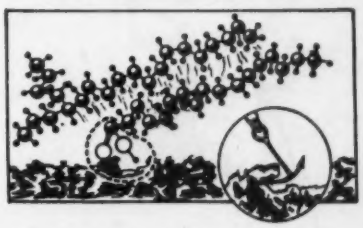

Fig. 7—A molecule of this sort having an "end" that will respond to the attraction of an electrical field is called a polar molecule. Such a molecule is strongly attracted by the electrical field that exists at the surface of a piece of metal. This attraction has the effect of "anchoring" the molecule to the metal.

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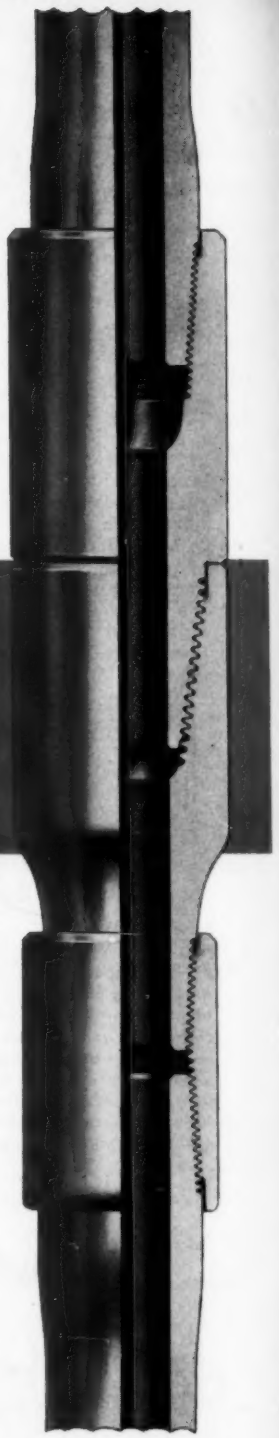

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Linear Steady-State Flow of Oil and Water

IN a porous medium containing oil and water under static conditions there is known to be a pressure drop existing between the liquid phases. The pressure drop has been shown to depend upon the saturations of the respective phases and upon the distribution of those phases within the pore spaces (recognized as drainage and imbibition processes, for example). If the same pressure exist between phases under flowing conditions as well as in a static system, there should then be some relationship between saturation gradients in the direction of flow and flowing pressure gradients because both would depend upon the capillary pressure - saturation properties of porous medium. This relationship is the topic to be discussed.

Consider a horizontal system in which oil and water only are flowing, both in one direction under steady conditions (see Fig. 1). At

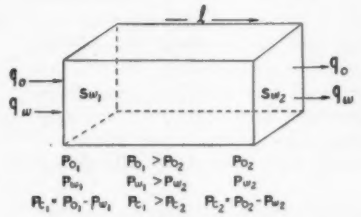

Fig. 1

the inlet end let the saturation of water be S_{w_1}, and at the outlet end let the water saturation be S_{w_2}. For sake of argument let S_{w_2} be greater than S_{w_1}. Assume that water wets this system and that the static capillary-pressure curve (drainage) for oil and water in the porous medium be given by Fig. 2. The capillary pressure at Point 1 is $P_{c_1} = P_{o_1} - P_{w_1}$ and that at Point 2 is $P_{c_2} = P_{o_2} - P_{w_2}$ such that $P_{c_1} > P_{c_2}$ because the saturations have been so chosen.

If these capillary pressures hold in the flowing system, then for the saturation gradient which has been chosen, the gradients in the oil and water phases are related. Thus $(P_{o_1} - P_{o_2}) = (P_{c_1} - P_{c_2}) + (P_{w_1} - P_{w_2})$ or, in differential form:

$$\frac{dp_o}{dl} = \frac{dp_c}{dl} + \frac{dp_w}{dl} \qquad (1)$$

This relationship between the oil and water-phase gradients when the saturation gradient is fixed can be coupled with relative permeability concepts to yield a useful expression for oil or water flow.

By Darcy's law the pressure gradient in the oil phase is given in terms of rate of flow, relative permeability, and viscosity, or:

$$\frac{dp_o}{dl} = -\frac{q_o \mu_o}{k_o} \qquad (2)$$

Similarly, for the pressure gradient in the water phase:

$$\frac{dp_w}{dl} = -\frac{q_w \mu_w}{k_w} \qquad (3)$$

where the negative signs are recognition that q_o and q_w are positive when measured in the direction 1, and q_o and q_w are volume rates of flow per unit of cross-sectional area. It will be noted that for the steady state chosen, both q_o and q_w are constant at all values of 1.

Substituting (2) and (3) in (1) gives:

$$-\frac{q_o \mu_o}{k_o} = \frac{dp_c}{dl} - \frac{q_w \mu_w}{k_w} \qquad (4)$$

If only oil and water are flowing their sum must be equal to a constant. The constant total rate of flow is q_t, equal to $q_o + q_w$, at any point. Substituting this in

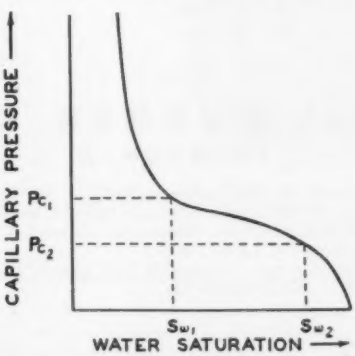

Fig. 2

Equation 4 for q_o and rearranging, yields, for q_w:

$$q_w = \frac{q_t + \frac{k_o}{\mu_o}\frac{dp_c}{dl}}{1 + \frac{k_o}{k_w}\frac{\mu_w}{\mu_o}} \qquad (5)$$

The change of capillary pressure with distance is dependent only upon the change of saturation with distance and can be thus written:

$$\frac{dp_c}{dl} = \frac{dp_c}{dS_w}\frac{dS_w}{dl}$$

Substituting this in Equation 5 gives:

$$q_w = \frac{q_t + \frac{k_o}{\mu_o}\frac{dp_c}{dS_w}\frac{dS_w}{dl}}{1 + \frac{k_o}{k_w}\frac{\mu_w}{\mu_o}} \qquad (6)$$

This resultant equation states that the rate of water flow at a point is dependent upon the total rate of flow, the relative permeabilities to oil and water, the viscosities of the oil and water, the saturation gradient, and the capillary pressure properties of the system.

A similar expression results for oil flow when $q_w = q_t - q_o$ is substituted in Equation 4.

The expression is:

$$q_o = \frac{q_t - \frac{k_w}{\mu_w}\frac{dp_c}{dS_w}\frac{dS_w}{dl}}{1 + \frac{\mu_o}{\mu_w}\frac{k_w}{k_o}} \qquad (7)$$

These equations, although they apply to a linear steady state system are very useful and permit a better understanding of relative flows of oil and water. They will be discussed in greater detail later.

Nomenclature

P = pressure
k = permeability
μ = viscosity
l = distance
q = volume rate of flow per unit area
S = saturation
o = subscript for oil
w = subscript for water
c = subscript for capillary
1,2 = subscripts for position

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, Penn State College

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OIL AND GAS EQUIPMENT Digest

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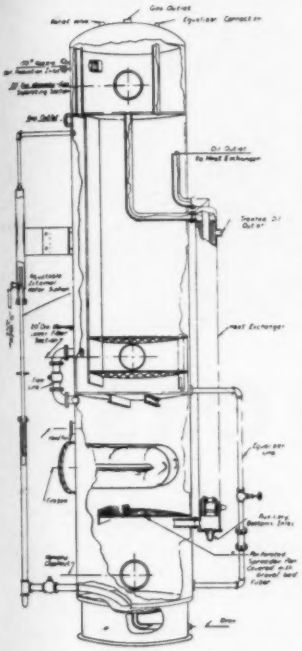
by Dan B. Miller

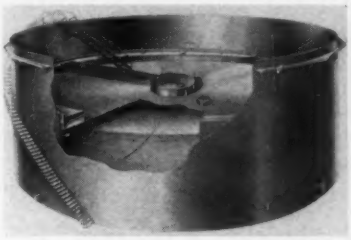
27 NEW TYPE "J" TREATER consists of a large vertical shell that is divided into three sections. In the separator or top section, cold separation of gas and oil takes place. In the bottom section is included a large-capacity firebox which serves as a heater and water knockout. The settling or middle section of the treater is a large-capacity quiet zone for the final separation of oil and water. The three sections are independent of each other, being separated by heavy diaphragm plates. Each section may be drained or inspected separately. Some features of this model include: immersion twin-tube firebox which gives higher heating efficiency; a new improved heat exchanger; and improved distribution of emulsion flow through the heating section. Surfaces of large gas-separation section are wetted by oil thus reducing corrosion, and delivering cooler, more stable oil to stock. *Black, Sivalls & Bryson, Inc.*



IT'S NEW CHECK IT

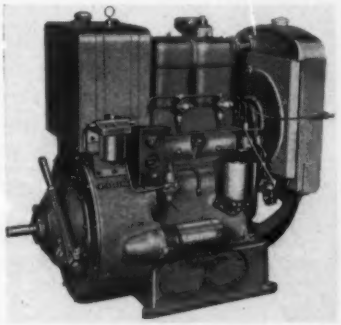
28 STRATA-SEAL, STRATA-CRETE. Strata-Seal is a practical development to combat lost circulation and returns. Advantages are: possible reclamation of wells about to be abandoned; elimination or reduction of down time, no detrimental effect on viscosity, water content, or gel strength of drilling fluid; does not interfere with coring operations; and is easily added to mud. Strata-Crete is an aggregate to lighten cement slurries. Higher columns of cement can be pumped with lower pressure. The material helps materially to reduce lost circulation of cement. *Strata-Crete Sales, Great Lakes Carbon Corp.*

29 CENTER-WEIGHTED FLOATING ROOF represents a new low-cost design for petroleum storage, developed to combine the vapor-saving and corrosion-resistant features of the double-deck floating roof with the more economical aspects of the conventional pan-type floating roof. Roof itself is a low-angle, inverted flexible cone which, floating on top of the petroleum products in the tank, gains stability by the weighted pressure of the cone in the liquid. A fully effective seal against the side walls of the tank is maintained by an impervious fabric seal connecting the roof with a steel shoe actuated by a series of hangers and pushers. Drainage is accomplished from the depressed center of the roof, through a sump connected by a pipe or hose with the outside of the tank at ground level. Since it allows no air vapor space, it prevents the loss of any volatile elements, stops corrosion, is fire resistant, and holds the product free from contamination. *Graver Tank & Mfg. Co., Inc.*



IT'S NEW CHECK IT

30 TWO-CYLINDER DIESEL ENGINE is rated at from 20 to 30 hp. within an operating speed range of 1,200 to 1,800 r.p.m., has a 4½-in. bore and 5¼-in. stroke, and is an extra-heavy-duty, vertical, four-cycle, mechanical-injection diesel engine. Engine features low operating cost and heavy-duty construction. It is built as a complete, self-contained, ready-to-operate unit and is offered as an electrical-generating set, pumping unit, and with clutch or stub shaft power takeoff for direct connection or belt drive. *Nordberg Manufacturing Co.*



The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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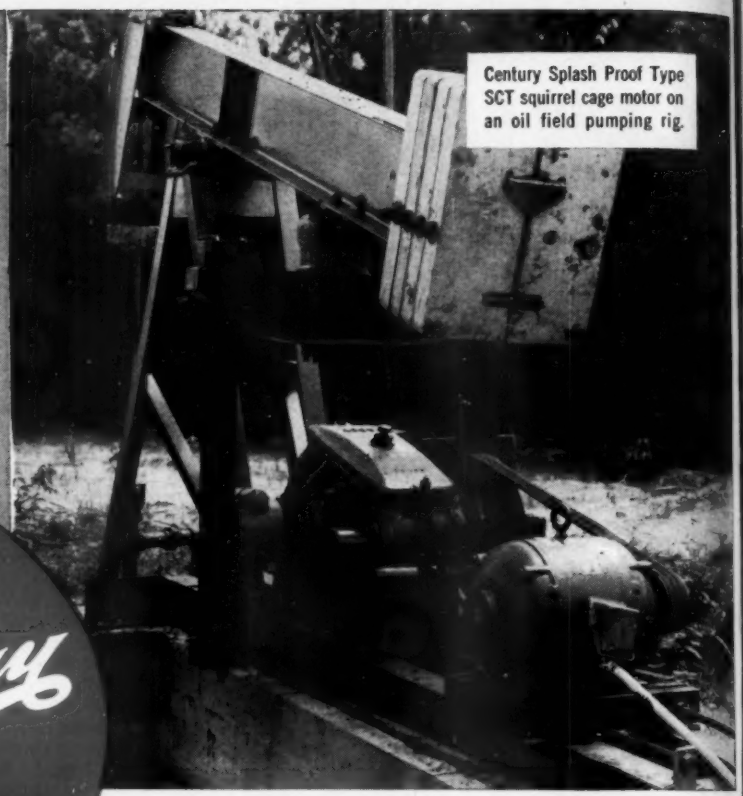
For Steady, Economical Pumping



Century Splash Proof Type SCT squirrel cage motor on an oil field pumping rig.

SPECIFY Century TYPE SCT

Protected MOTORS

Century Type SCT "high slip" pumping unit motors save wear and tear on equipment. This high slip characteristic permits the motor to slow down as the load comes on. This cushions the impact of the peak load and minimizes the sudden shock to both motor and equipment.

Century Splash Proof Motors assure continuous production in any kind of weather.

Thousands of Century splash proof motors have been operating, out in the open, in rain, snow, sleet and ice, since their development 15 years ago.

They are widely used for the operation of oil well and irrigation pumps, cooling towers, river lock and dam installation and where the equipment is regularly washed down, etc.

Century builds a wide range of motors for oil producing, refining and distributing. Specify Century for all your electric power requirements.

See your nearest supply store for complete information.

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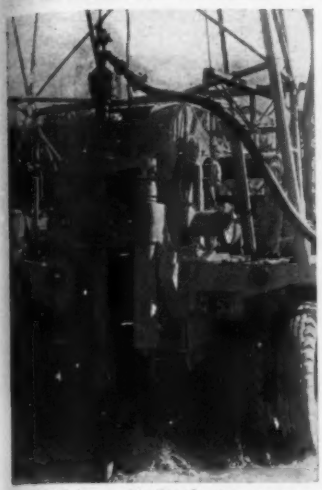
Century C MOTORS

657

Century GENERATORS—

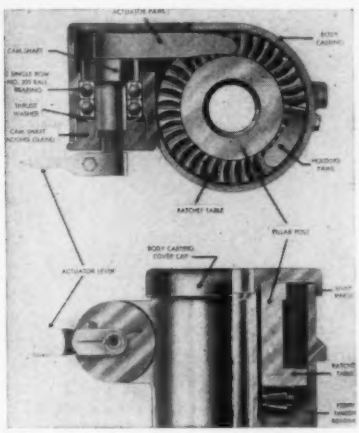
Where public service current is not available, Century Generators will provide adequate, continuous electric power. Depending on the load per motor and the size of generator, from 10 to 30 wells can be operated from one generator. They provide a dependable source of oil field power.

31 FAILING 1500 HOLEMASTER, designed for drilling in areas where boulders or loose unconsolidated materials predominate, features a special arrangement whereby the kelly is eliminated and drilling is accomplished by connecting the swivel directly to the casing. The inside diameter of the drive rod is increased to 4¼ in. This arrangement provides for the use of 3-in. line pipe casing and allows sufficient clearance for the couplings. Sections of casing are added as the hole is deepened, and it is unnecessary to make trips in and out of the hole. Attachments are also available to quickly convert this unit back to conventional drilling with the standard kellies. *George E. Failing Supply Co.*

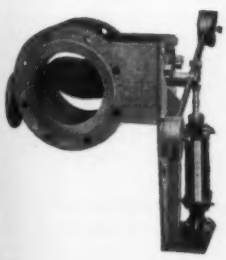


IT'S NEW CHECK IT

32 UNIVERSAL MODEL ROD ROTATOR. Model HU is a totally enclosed all-weather model which has met with outstanding success in all climates and has proven particularly effective in areas subject to ice and snow. A feature in this model is that the totally enclosed rachet table provides automatic rotation under the most severe conditions. It may be used with all types of pumping units. Model HU rotates the surface rod string a fraction of a turn on each reciprocation and when used in combination with Huber paraffin scrapers it provides for automatic paraffin elimination in pumping wells. Rod rotation in crooked holes equalizes wear on couplings and surfaces of the working barrel thus increasing the length of service by these parts. *J. M. Huber Corp.*



IT'S NEW CHECK IT



33 OFF-CENTER RELIEF VALVE simplifies the control of 15-psig. saturated steam with a low-pressure drop. The valve illustrated is 8 in. in diameter and has 150-lb. American Standard raised face flanges. A double crank arm with adjustable weights facilitate accurate setting. The cylinder is not an actuator but simply a dash pot. On the left can be seen a 2-in. flanged outlet for overload relief. Disk-type valves are available in smaller and larger sizes and higher pressure. They are also used in air, gas, liquid, and semisolid service for the control and shut off of volume and pressure. *R-S Products Corp.*

IT'S NEW CHECK IT

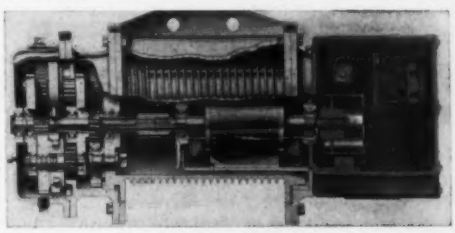
34 CASING SCRAPER can be either rotated on a tubing string or operated vertically on a wire line to remove burrs, cement, mud, paraffin, or other restricting agents from the casing wall. This scraper is simple yet rugged in construction and is designed to permit circulation through the tool when necessary. Cutters are held against casing by heavy springs and are so spaced that they total more than 360°, consequently they must contact the full circumference of the casing. Although the cutters are held securely to the tool by a completely foolproof locking device, they can be quickly and easily removed and exchanged in the field. Spacing of the cutters is arranged so as to facilitate fluid flow past the outside of the tool, and 66 hard-faced cutting edges and the helical design of the teeth combine to give a shearing action that effectively removes burrs and foreign material from the casing wall. *Grant Oil Tool Co.*

IT'S NEW CHECK IT

35 BOILER BLOWOFF VALVE. The head, or disk, is made of "H" monel metal and the seat is of monel metal. This combination of metals has proven to be ideally suited to withstand the erosive and corrosive conditions to which a slow-opening blowoff valve is subjected. Seat, which is renewable, is provided with upper and lower sealing gaskets to protect the seat threads from corrosion. Stem is made of stainless steel and the stem nut is made of bronze to provide longer life. All parts are easily renewable without the use of special tools. Valves are offered in 1½, 2, and 2½-in. sizes, in cast iron or cast steel, for pressures up to and including 600 psi. *Everlasting Valve Co.*

IT'S NEW CHECK IT

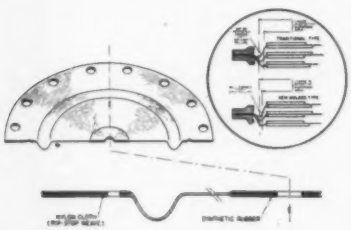
36 BOB CAT HEAVY-DUTY ELECTRIC CABLE HOISTS. Hoists are manufactured in ½, 1, 1½, 2, 3, and 5-ton capacities. An outstanding feature is its total enclosure of the motor within the cable drum. This greatly reduces over-all dimensions and affords substantial weight savings. Due to the enclosed hoist design, motors are completely protected against moisture, splashing liquids, weather, dust, and corrosive atmospheres. Hoists are powered by high-torque Ohio Motors specially manufactured for use with Bob Cat units. Gear



reduction is by means of a double internal gear train that incorporated two Weston-type load brakes. Load-lifting and carrying parts are made of steel forgings and castings. Safety factor is in excess of 6 to 1. *The Cleveland Chain & Manufacturing Co.*

IT'S NEW CHECK IT

37 NEW NYLON-IN-RUBBER DIAPHRAGM. A new-type diaphragm of molded synthetic rubber strengthened with nylon fabric, will improve the precision of gas pressure control with high-pressure balanced valve pilot loaded regulators, will aid in the assembly of the diaphragms in such equipment, and will increase the period of trouble-free regulator service with respect to diaphragm maintenance. Among significant construction details are: the heat-molded shape of the circular trough which lies between the case clamping ring and the diaphragm clamping plates; the extra rubber thickness at both the peripheral and central clamping zones; and the type of weave used for the inserted fabric and its position within the diaphragm. *Rockwell Manufacturing Co.*



IT'S NEW CHECK IT

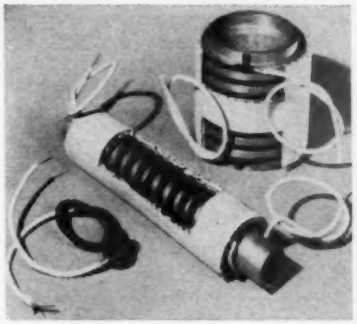
38 NEW BUNG BUSHING BARREL PUMP drops into drum opening and securely holds pump to drum. Fits snugly around tube and prevents foreign matter from entering drum. Tighten thumb screw and lock both bung and pump with one operation. Fits 1½ and 2-in. openings on 15 to 55-gal. drums. All steel except spout. *General Scientific Equipment Co.*

IT'S NEW CHECK IT

39 ANGLE SIGHT FEED VALVES. Single angle sight feed valves are equipped with needle-valve control, and regulates oil flow from full flow to a complete shutoff. Smooth easy hairline adjustments can be made and retained through the use of a friction screw. The inherent characteristics of this style valve are large orifices and a reduction of pressure drop because of the absence of restrictions. Furnished in three body sizes machined from bar stock, with inlet of ⅛ to ¼-in. female pipe thread, and outlets of ⅛ to ½-in. female pipe threads or compression fittings. Multiple sight feed valves permit multiple oiling controlled from a central point. Oil from a reservoir or pump is fed through the valves to a number of individual bearings, thus replacing from 2 to 24 oilers. Oil fed to each bearing can be individually adjusted and observed at one station. *Oil-Rite Corp.*

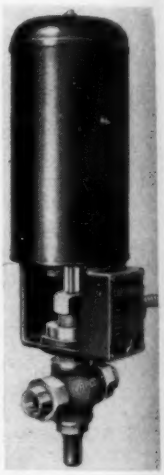
IT'S NEW CHECK IT

40 SERPENTINE FLEXIBLE ELECTRIC HEATING UNITS. Can be applied to pipes, valves, cylinders, and containers carrying viscous or free-flowing fluids, chemicals, plastic compounds, or gases. Sheathed in ⅛-in.-diameter spring steel, the units combine extreme flexibility and strength with minimum bending radius of ½ in. Due to refractory insulation, they can operate at temperatures approaching 1,000° F. for long periods. Standard units are offered in lengths of from 1 to 10 ft., in 1-ft. increments, for 115 or 220 volts. Three types are available: 5 watts per lineal inch, giving a sheath temperature of 475° F. in free air; 10 watts, 650° F., and 15 watts, 700° F. *Titan Manufacturing Co., Inc.*



IT'S NEW CHECK IT

41 SARCOSTAT HYDRAULIC MOTOR VALVE. This valve is designed for automatic operation by thermostats, or pressurstats, or by liquid level or flow controls. As a shutoff valve in an inaccessible location, it can also be actuated by a push-button. Valve is constructed to handle steam, water, oil, gas, air, etc. The valve operator, actuated by hydraulic power, operates single-seated valves up to 1½ in. or double-seated valves up to 4 in. at 125 psi. It does this by direct thrust, without resort to pilots, gears, or levers. When the full stroke is used, standard valves will open in 60 seconds and close in 10 seconds. Also available with an adjustable stop for partial throttling. Valve bodies are of brass or iron with union or flanged connections. Various types of valve bodies are available; single-seated, needle, piston, or double-seated. Operators are dust, moisture, and fumeproof. They also can be furnished explosionproof. *Sarco Co., Inc.*



IT'S NEW CHECK IT

42 MICROSYN, a precision regulator, is superior to step regulators in that it provides regulation in infinitesimal steps. The microsyn can do three kinds of things. It can produce a voltage proportional to turning a rotor over a range of plus or minus 10°, with a sensitivity of 20 seconds; it can produce a torque that is linear with the square of a signal current; and it can act as an elastic restraint generator, producing a torque proportional to the product of the square of a signal current; and it can act as an elastic restraint generator, producing a torque proportional to the product of the square of a current and the angular displacement. The microsyn consists of a moving element in a four-pole field. *Westinghouse Electric Corp.*

IT'S NEW CHECK IT

43 ELECTRICAL ROD-WEAR DETECTOR FOR TUBING. The instrument weighs only 20 lb. and can be operated by one man. It is designed for rod-wear inspection of tubing on the rack. This instrument is offered on a service or rental basis in the Mid-Continent and Gulf Coast areas. *Tuboscope Co.*

Gulf Research
uses the new Electro-Chemograph to analyze engine deposits

- *It's fast*
- *It's accurate*
- *It's convenient*

GULF Research and Development Co., Pittsburgh . . . central research organization for the Gulf Oil Companies . . . speeds up routine chemical analysis with their new Type E Electro-Chemograph. Typical time-saving task for this "automatic chemist" is the analysis of minute amounts of internal combustion engine deposits left on valve stems and similar surfaces. Gulf Research has set up routine procedures to determine for lead, copper, nickel, zinc, and other metals.

Gulf men have streamlined the operation to a point where they can now do 9 determinations in 45 minutes. The Electro-Chemograph tells them what metals . . . and how much of each . . . are in the test sample. Controls are conveniently grouped on the console to provide easy selection of range and damping to meet just about all analytical requirements. The whole test procedure is so simple, as a matter of fact, that direction plate instructions on the console prove ample for 90% of routine work.

The new Electro-Chemograph gives you polarographic analysis at its best. Applications are broad. Proved superior for research work as well as routine analysis, the instrument is being used effectively by production and test labs in detecting small quantities of minor additives such as catalysts, plasticizers, oxidizing agents . . . for most common wet analyses on steel and non-ferrous materials . . . in trace analyses for poisons . . . in assaying hormones and vitamins . . . and in many other applications in manufacturing, research, and testing fields.

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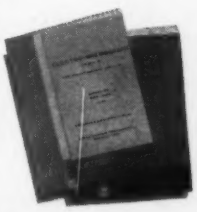
Meticulous attention to detail has produced in the new Type E Electro-Chemograph and associated apparatus modern instrumentation for accurate polarographic analysis. The equipment meets the most advanced needs of polarographic research; yet it's simple enough in operation for any technician to use in rapid routine analysis.

A built-in Speedomax Microampere Recorder measures maximum diffusion current so accurately in the undamped condition, that the envelope of peak current values (the distance from bottom to top of the large Electro-Chemograph curve pictured here) can be used directly as a basis of precise quantitative analysis. This permits more absolute quantitative determinations employing standard diffusion current constants for measuring various substances.



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Our new Cat. EM9-90 tells all about the new Type E Electro-Chemograph. *Also*—our bibliography on polarographic analysis has recently been revised to include every paper published between 1903 and 1949 which we've been able to discover. Write our nearest office, or 4959 Stenton Ave., Phila. 44, Pa.

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PIPE LINES

Safety Bill Introduced

WASHINGTON. — Legislation authorizing the Federal Power Commission to prescribe safety requirements with respect to the construction, operation, and maintenance of natural-gas pipe lines has been introduced in Congress by Rep. John S. Heselton of Massachusetts.

Heselton told the House his action was prompted by explosions on two successive days along the new Transcontinental Gas Pipe Line Corp. line from Texas to New York, but that at least four other explosions have occurred this year, and there may have been others. No information on such occurrences is available, he said, since the FPC does not require reports or compile statistics.

Under existing law, the only power the commission has with reference to safety requirements are in connection with normal conditions which may be incorporated into the initial certificate. Approximately 100,000 miles of main-transmission lines are now in operation or authorized, of which some 35,000 miles have been certificated by the FTC since 1942. Applications covering about 16,000 miles of line are now pending.

Heselton said he had no anticipation that his measure would be considered this year but was offering it now so that the commission or other interested agencies can begin work on reports that he will request early in the coming session of Congress. He asserted there is ample precedent for the establishment of safety regulations in the treatment of other utilities.

Sees No Utah Action Soon

SANTA FE, N. M. — A prediction that the Federal Power Commission won't be very eager to approve Utah Pipeline Co.'s application for a natural-gas line from the San Juan basin of New Mexico and Colorado to Salt Lake City was made here by a state official.

The official, who withheld his name, said he based his opinion on these factors:

1. It took El Paso Natural Gas Co. more than 2 years to gain approval for its pipe line from the San Juan basin in northwestern New Mexico to Topock, Ariz.

2. A power commissioner told him recently that it was time for the Southwest to take stock of its resources to make sure it doesn't send too much gas out of the area.

The Utah Co. line, if approved, would carry 96,000,000 cu. ft. for Utah industrial use. It would serve several Colorado and Utah communities along the route. The El Paso line is to carry an average of 97,000,000 cu. ft. of gas to the West Coast for industrial purposes.

Still another delaying factor in opening the Utah market to the San Juan basin, officials here said, is the fact that three rival firms are seeking permission to build a pipe line to the Salt Lake City area.

Coal-Rail Petition Denied

WASHINGTON. — An application filed by coal and railroad interests for rehearing of the Federal Power Commission's order of November 8 authorizing construction of natural-gas lines and facilities to the New England area has been denied by the commission.

The commission found that the application did not present any question of law or fact not already considered and determined, and that good cause had not been shown for granting a rehearing.

The application for rehearing was filed by the National Coal Association, United Mine Workers of America, Fuels Research Council, Inc., Anthracite Institute, Railway Labor Executives Association, and the Chesapeake and Ohio Railway Co., all intervenors in the proceedings. No other petition for rehearing was filed.

Seeks Virginia Line O.K.

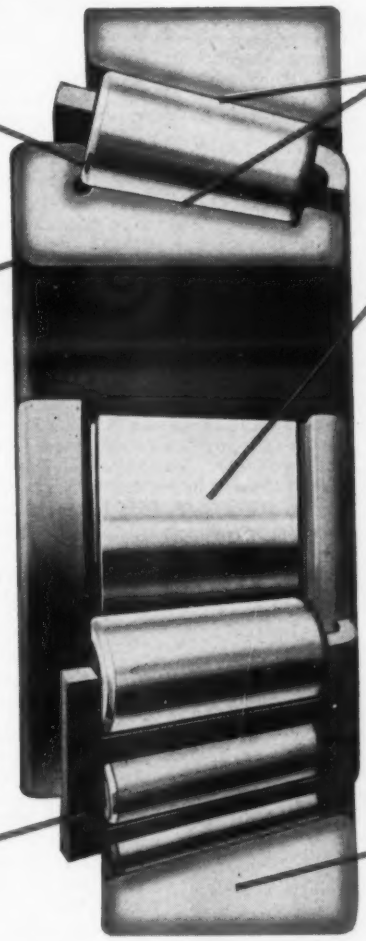
WASHINGTON. — Southwestern Virginia Gas Transmission Co. has filed an application with the Federal Power Commission seeking authorization for construction of a 16.8-mile pipe line, and natural gas to supply it from Transcontinental Gas Pipe Line Co., of Houston.

The proposed line would extend from a point on Transcontinental's main line just north of the North Carolina-Virginia state line to a point near the southeast corner of Martinsville, Va. Southwestern Virginia Gas Transmission Co. would transport gas for sale to Southwestern Virginia Gas Co., an affiliate. The latter company would resell the gas to consumers in Martinsville and vicinity now served with manufactured gas.

The application estimates annual requirements at 45,284,000 cu. ft. with a peak day of 211,000 cu. ft. in the first year, ranging to 143,120,000 cu. ft. annually with a peak day of 1,006,000 cu. ft. in the fifth year.

Construction cost is estimated at $229,250.

10 reasons why your best bet in bearings is TIMKEN®



1 *Rib of cone maintains roller alignment, prevents skewing, assures maximum bearing capacity.*

2 *Generous radius permits greater shaft strength.*

3 *Available in 26 different types.*

4 *Precision manufactured. Available with runout tolerance of only seventy-five millionths of an inch (.000075").*

5 *Soft steel cage separates rollers, prevents scuffing.*

6 *Case-hardened surfaces resist wear.*

7 *Micro-inch surface finish makes friction negligible.*

8 *Available in 5850 sizes.*

9 *Made from Timken fine alloy steel for long bearing life.*

10 *Tough inner core resists shock.*

OTHER tapered roller bearings may *look* like Timken® bearings. But there is no other tapered roller bearing which gives you as many important advantages as you get with Timken.

Ten of these advantages are listed above. They all stem from the fact that the Timken Company is the foremost producer of tapered roller bearings and leads in (1) advanced design, (2) precision manufacture, (3) rigid quality control, (4) special analysis steels.

Be sure that every tapered roller bearing *you* use carries the name "Timken", the trade-mark of The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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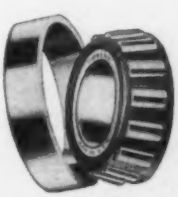

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Ray L. Smith & Son, Inc. Now Busy in Virginia

RAY L. SMITH & SON, INC., El Dorado, Kans., was incorporated in 1947 to succeed Ray L. Smith Construction Co., the firm name under which business was conducted from 1941 to 1947. Ray L. Smith was a partner in Truman & Smith Co. from 1926 to 1941. He began pipelining with Empire Pipe Line Co. in 1916.

History: In 24 years the contracting firms identified with Ray L. Smith, in his notable pipe-line career, have laid several thousand miles of lines mostly in the Mid-Continent area. During World War II the Ray L. Smith Construction Co. organization laid four sections on the "Big Inch" system of War Emergency Pipelines, Inc.

The most difficult undertaking handled by Smith was the laying of a section of the 26-in. line laid last year through the rugged mountains of West Virginia for Atlantic Seaboard Corp. and Virginia Gas Transmission Co.

Current operations: The company is now engaged in projects of Commonwealth Natural Gas Corp. in the vicinity of Stanardsville, Petersburg, Norfolk, Suffolk, and Newport News in Virginia. These projects include 182 miles of line ranging from 8 to 18 in. and several river crossings. Smith has already completed a line to connect with the manufactured-gas plant facilities at Richmond, Va. Operations are now under way for lines to connect with existing gas-plant facilities at Norfolk and Newport News. In recent weeks, work has been carried on for the laying of a 4.8-mile line in the James River near Newport News. Other submarine lines are in the process of being laid at depths as low as 45 ft. below mean low water in the South Elizabeth and East Elizabeth rivers near the Norfolk ship channel.

RAY L. SMITH

Equipment: The company is a Kansas corporation which has the advantage of operating over the United States from the centrally located headquarters base at El Dorado, Kans.

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Tapecoat in 24" width is the economical coal tar coating for "cigarette-wrapping" mechanical couplings.

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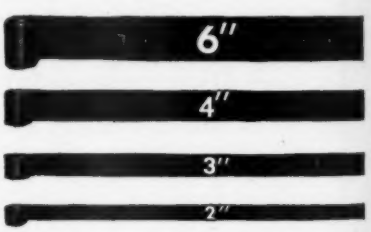

Tapecoat in 6", 4", 3" and 2" widths —ideal for spiral-wrapping welded field joints, service connections, pipe under streets and sidewalks, and pipe through building walls, etc.

Write for full details and prices on Tapecoat —the coal tar coating with a width for every purpose.

• Reg. U. S. Pat. Off.

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489 Fifth Avenue, New York 17, N.Y.; Jas. E. Mavor Co., 514 M and M Building, Houston 2, Texas; 175 Niagara Street, Denver 7, Colo.

Equipment consists of two big-inch spreads.

Personnel: Ray L. Smith, head of the firm, is president of the Pipe Line Contractors Association. His son, Ray Leigh Smith, general superintendent, is in charge of operations for the Commonwealth contract in Virginia. Carl Colvin is engineer. Spread foremen are Bill Frost and R. M. (Three-Fingered) Jones.

Expansion O.K. Sought

WASHINGTON.—Northeastern Gas Transmission Co. has applied to the Federal Power Commission for authority to extend its presently authorized pipe-line system to provide natural-gas service to all New England towns which Algonquin Gas Transmission Co. also proposed to serve.

Northeastern's new application proposed construction of 441 miles of lines and an 8,000-hp. compressor station to cost an estimated $14,000,000. This is in addition to the already authorized project which totals about 511 miles of lines in New Hampshire, Massachusetts, and Connecticut.

Delivery capacity of the proposed integrated project would be approximately 414,000,000 cu. ft. of gas per day. Under peak-load conditions the system would be capable of delivering about 500,000,000 cu. ft. daily when fully powered with winter-flowing temperatures.

Trinidad to Build Line

WASHINGTON.—The Federal Power Commission has ordered Colorado Interstate Gas Co., of Colorado Springs, Colo., to connect its pipeline facilities with those proposed to be built by the city of Trinidad Colo., and to deliver and sell up to 1,000,000 cu. ft. of natural gas per day for local distribution in Trinidad.

Trinidad will build a 35-mile line from a distribution system in the city to a proposed point of connection with Colorado Interstate's Panhandle-Denver transmission line. Estimated construction cost of transmission and distribution facilities is $1,100,000. An artificial-gas distribution system which previously served Trinidad was abandoned in January 1950.

Indians O.K. Line Passage

SARNIA, Ont.—Indians of the Sarnia Reserve have granted Susquehanna Pipeline Co. permission to extend its new pipe line 1½ miles through the reserve to the Polymer Corp. plant at Sarnia. The line, running from the Sun Oil Co. refinery at Toledo to the Polymer plant, will carry light ends beginning early in 1951, and will replace shipments by tank car.

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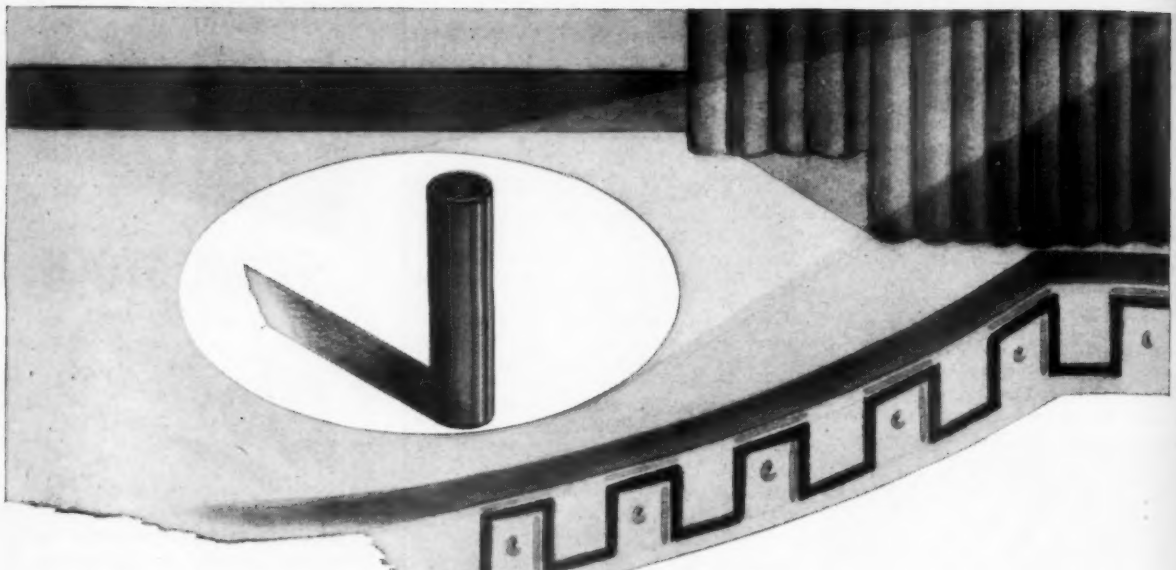

Put the spotlight on tubing

Tubing is more important than you think. Unlike stage stars, however, tubing is a *silent* performer. And because you never see it work, you may lose sight of its importance and thus consider it a minor detail.

What happens when a line (tubing) lets go? You suffer a loss of production—and that is always costly.

Yes, tubing IS very important!

To make *sure* that your condensers and other units are equipped with tubing that is reliable, see that Wolverine tubing is installed.

Wolverine tube, you know, is quality-controlled from ore to finished product. You can depend upon it. All our efforts are concentrated on making tube as good as it can possibly be produced.

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REFINING

A.C.S. Mobilization Policy

WASHINGTON.—Total mobilization of the nation's scientific and technical man power between the ages of 18 and 65, in the event of an all-out war effort, is recommended by the American Chemical Society in a report to the National Security Resources Board made public recently.

The chemists' all-out mobilization plan, which would transfer control over scientific manpower from Selective Service to a new civilian board, would become effective only in a situation so grave as to compel adoption of a national service act—at least for technical personnel—under the provisions of the report.

For the present, the report says, optimum utilization of scientific and engineering skills within the terms of existing legislation should be sought through the modifications in procedure suggested to Maj. Gen. Lewis B. Hershey, director of Selective Service, by his own scientific advisory committee. The central proposal of these committees is that superior university students be deferred from military service indefinitely to continue their studies, and even longer if their training and capabilities are needed elsewhere in the defense program.

New Socony T.C.C. Unit

TRENTON, Mich.—By mid-January, Socony-Vacuum Oil Co., Inc., will commence initial operation of a new 15,000-bbl. per day, modified Thermofor catalytic cracking unit at the refinery here. The new plant, utilizing air-lift for circulating catalyst, will be the second of its kind to go on stream in this country.

Replacing a 10,000-bbl. per day fixed-bed Houdry unit, the new T.C.C. facilities will increase production of high octane motor fuel by 50 per cent, improving flexibility and reducing investment and operating costs, according to Socony. The 25,000-bbl. per day Trenton refinery also incorporates 7,700 bbl. per day in thermal cracking and reforming facilities.

Construction of the Trenton unit began last spring, when the contract was awarded to C. F. Braun & Co., of Alhambra, Calif. The first unit of this type was completed in October at Magnolia Petroleum Co.'s Beaumont refinery, and seven similar units are presently under construction at Socony-Vacuum refineries in this country.

Esso Sells Buna-N Plant

BATON ROUGE.—The privately-owned Paracril synthetic rubber plant at Esso Standard Oil Co.'s refinery here has been sold to the United States Rubber Co., Cecil Morgan, Esso vice president, announced last week. The new owner is understood to be planning continued production of Buna-N rubber at the Baton Rouge unit.

The plant was built in 1940 and commenced production the following year of the specialty type oil-resistant synthetic rubber. Since that time the plant has been in almost continuous operation making a number of Buna-N type rubbers trade-marked Paracril. Successful operation of the unit paved the way for the design and operation of the Buna-S plants

NELSON REFINERY-CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, October.
INDEX 1946 = 100)

	1947	1948	1949	Sept. 1950
Centrifugal pumps	109.0	120.0	118.9	133.7
Reciprocating pumps	128.5	138.1	144.6	154.4
Compressor	114.0	128.0	120.0	125.9
Engines	109.0	120.0	115.5	120.5
Motors	110.0	112.7	114.0	135.3
Transformers	116.0	116.0	116.0	123.4
Instruments	113.0	120.0	122.0	133.8
Miscellaneous equipment average	114.2	122.1	121.6	132.4
Materials component	122.4	139.3	143.6	153.2
Labor component	113.5	128.0	137.1	146.4
Refinery construction index	117.0	132.5	139.7	149.1

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So effective is Strata-Seal's bridging action, that even in a number of extreme cases, it has restored circulation and saved abandonment of wells.

Check these advantages

1. Strata-Seal protects investments by making possible reclamation of wells about to be abandoned.
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Available through leading mud service companies.

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Strata-Crete is used with high early, slow set, or standard oil well cement. It is available through leading oil well cementing concerns.

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which were later incorporated under the Government's synthetic rubber program for the manufacture of GR-S for tire manufacture.

Esso will continue to operate the butyl plants at Baton Rouge for the Government. This operation, producing inner-tube rubber is not affected by the Buna-N sale. Esso employes at the Paracril unit will be assigned other jobs in the refinery.

Gas-Turbine Locomotives

Following a successful test program in road service, Union Pacific Railroad has ordered 10 gas-turbine electric locomotives from General Electric Co. The new units, first of their type to be contracted in this country, will burn No. 6 fuel oil. They are slated for delivery late in 1951.

The first gas-turbine locomotive to be built in this country was a 4,500-hp. unit built by General Electric and American Locomotive Co. It was subjected to thorough road testing throughout the country. The 10 new locomotives are similar to the experimental unit.

"On the basis of results to date, the gas-turbine electric locomotive looks promising as an addition to steam and diesel electric power," said A. E. Stoddard, president of Union Pacific. The new locomotives will have a top speed of 65 miles per hour.

Sarnia Plant Work Begins

SARNIA, Ont. — Excavation work has begun for the new $18,000,000 refinery being constructed by Canadian Oil Companies, Ltd., at Froomfield near here, and ground work is scheduled for completion in time to start actual construction in March or April.

Contract for the steel tanks has been let to Horton Steel Co., Fort Erie, and for the grading to Frank Pidgeon & Son, Chatham. Consulting engineers on the project are Stone & Webster Co., Ltd. The plant will occupy a 200-acre tract just outside the newly designated limits of Sarnia.

Lubricants Survey Released

WASHINGTON.—Almost two-thirds (63 per cent) of all industrial lubricants consumed in the United States were used by eight large industrial states, according to an analysis of 1947 sales of lubricating oils and greases released recently by the Department of Commerce.

The analysis, carried out for and financed by the American Petroleum Institute, disclosed that combined sales of lubricants by 17 large companies accounted for 82.3 per cent of all sales. It also showed that the value of lubricants produced about equaled the value of distillate fuel-oil output, although the quantity of lubricants produced was only one-tenth as large as output of distillates.

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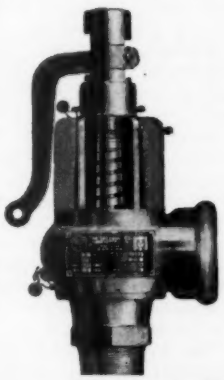
All Inferno Safety "Pop" Valves have tough malleable iron bodies. Tensile strength of material is 55,000 to 60,000 lbs. per sq. in. Depending on the requirements of the service, stainless steel or bronze stems are used. Valve seats are nickel alloy or bronze. Springs are high grade steel. You get greater safety, longer life and less blow down with Inferno. Write for Bulletin 11-E. Sold by supply stores.



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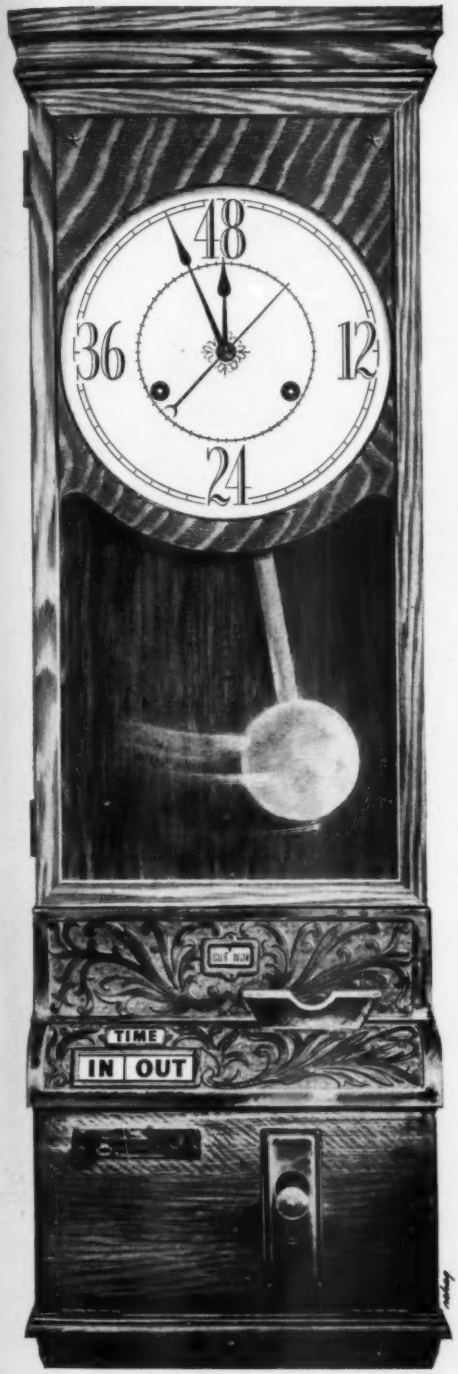

Too bad it can't be invented!

If someone could invent a day 48 hours long, you can be sure Kaiser Steel would be among the first to adopt it.

But Kaiser Steel is working around the 24-hour clock to produce more steel in order to meet pressing demands for many products—including Kaiser Steel line pipe.

Backing up this work schedule, Kaiser Steel is constantly expanding plant facilities to bring still more steel to the West.

Kaiser Steel pipe manufactured to latest API and ASTM specifications—in diameters from ½ inch to 30 inches, and in lengths up to 40 feet—is being produced. Shipping points are Fontana and Napa, California.

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KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 22" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅛" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	24" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

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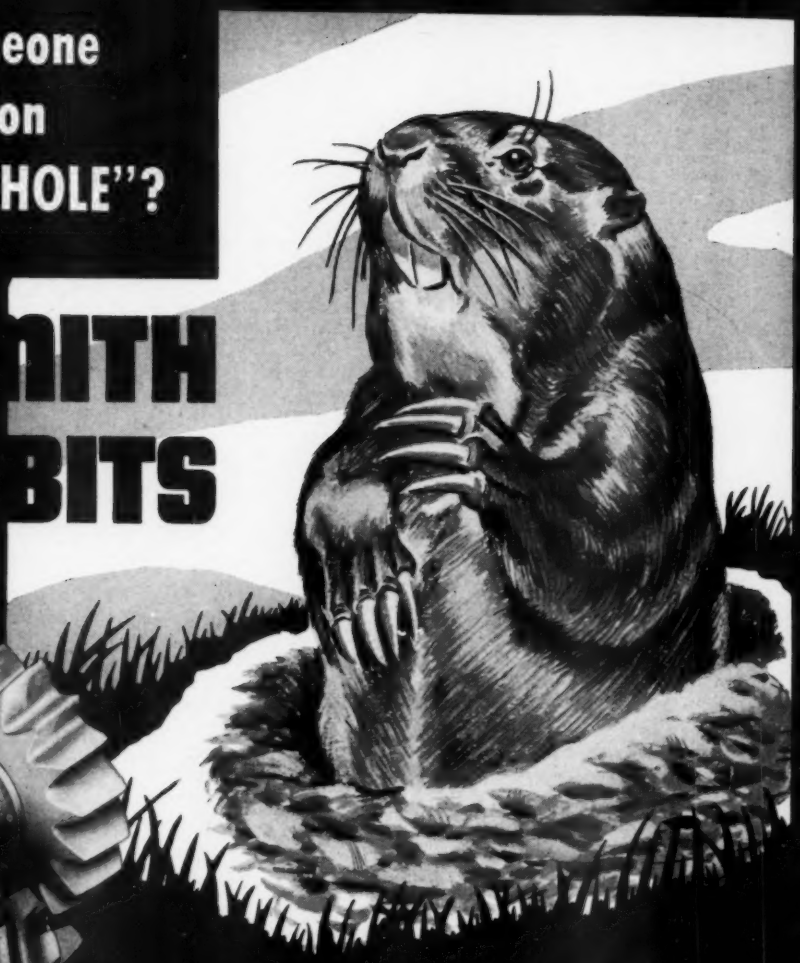
Did someone mention "MAKING HOLE"?



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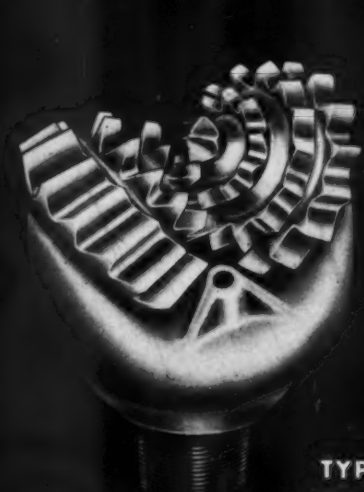

TYPE Y two-cone

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OIL TOOL CO.

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Among the Drilling Contractors

Seasonal Decline Felt In Active Rotary Rigs

Operating rotary rigs in the United States and western Canada totaled 2,480 during the week ended December 25 (latest report). This was a decline of 38 from the number reported active during the preceding week, and 41 under the all-time record number reported running the week before. The decrease is normal for this time of year. The total was still 280 above what it was a year ago.

Greatest decline was in Oklahoma where 41 fewer rigs were running than during the previous week. Activity also declined in the Gulf Coast, Kansas, and western Canada areas.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

Area—	Week ended 12-25-50	Change week ended 12-18-50	Change week ended 12-26-49
Gulf Coast	570	—14	+ 43
W. Tex.-N. M.	813	+ 9	+113
Ark.-N. La.-E. Tex.	168	+ 7	+ 15
Oklahoma	282	—41	+ 23
Kansas-Nebraska	164	— 5	+ 30
Illinois-Eastern	116	+ 8	— 8
Rocky Mountains	119	+ 5	+ 37
Pacific Coast	134	+ 2	— 6
Total U. S.	2,366	—29	+247
Western Canada	114	— 9	+ 33
Total	2,480	—38	+280

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States as a whole and the West Texas-New Mexico and Kansas-Oklahoma areas are shown by charts on pages 114 and 115.

Gene Reid Drilling, Inc., Bakersfield, Calif., is undertaking a wildcat test for its own account in the Arvin area of Kern County, California. Location is for 26-30 Woodworth in 30-31s-30e. It is about 2 miles southeast of the townsite. Hole is projected to 5,000 ft.

Drilling & Exploration Co., Los Angeles, is drilling for Humble Oil & Refining Co. at 1-B NL&F, a wildcat in the Oak Canyon area, Los Angeles County, California.

International Drilling Co., Los Angeles, is the contractor on a wildcat test to be drilled for Jack Herley in the Sargent area, California. Location is for 3 O'Connell.

J. M. Miller Drilling Co., Olney, Ill., is contracting for Ryan Oil Co. at 1 Keith, a wildcat test in the SW NW SW 7-3n-6w, Daviess County, Indiana.

Jones Drilling Co., Dallas, has a rig running for Sam F. Jordan at 1 Dowell, a projected 6,000-ft. wildcat test located in the A. R. Taylor Survey, 2 miles northwest of the Point townsite, in Rains County, East Texas.

Delta Drilling Co., Tyler, Tex., drilling for its own account, has opened a new oil field in Hopkins County, East Texas. Its 1 Taylor, located in the R. Earp Survey, at the south edge of the Connersville townsite, flowed at the rate of approximately 300 bbl. 49.5° oil per day through ¼-in. choke from the Bacon lime zone at 7,884-97 ft.

Glasscock Drilling Co., Shreveport is drilling for Mid-States Oil Co. at 1 Ogden, in the South La Grange field, Adams County, Mississippi. Location is in Lot 89, 42-6n-2w.

Austin Stewart Drilling Co., Shreveport, has a rig on a wildcat test being drilled for E. G. Bradham and associates in the N. D. Ellis Survey, northern Bowie County, northeastern Texas. Location, on the Blanchard lease, is just ½ mile south of the Red River, the Oklahoma line. Hole is projected to 5,000 ft.

Montgomery Drilling Co., El Dorado, Ark., is starting another Tuscaloosa sand test for Stanolind Oil & Gas Co. in the Big Creek field, Richland Parish, northeastern Louisiana. The new operation is 28 Delta, in 10-16n-7e.

W. C. Curry, Oil City, La., is drilling for Morris Coats at 1 Lee and associates, C SE NW 26-51n-12w, Caspiana field, Caddo Parish, North Louisiana.

Denman Drilling Co., Wichita Falls, Tex., has a rig working for Southern Union Producing Co. in the Kutz Canyon area, San Juan County, northwestern New Mexico. Present operation is 2 Hudson, NW NW 29-27s-9w.

Johnson Drilling Co., Cushing, Okla., has a rig on a wildcat location 8 miles southwest of Foreman, Little River County, Arkansas, where it is starting a 3,000-ft. test for E. H. Sabens. The location, in the SE SE SW 12-13s-13w, is just east of the Oklahoma line.

Loffland Brothers Co., Tulsa, has been awarded the contract for a test which Phillips Petroleum Co. and Carter Oil Co. will drill in Morton

Insure tight joint make-up and efficient sealing
BESTOLIFE LEAD SEAL
TOOL JOINTS AND CASINGS
THREAD AND GASKET COMPOUND
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SAND SAMPLE ENVELOPES
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1. EXCLUSIVE 500-TON SPECIAL prevents washouts and galling. Makes breaking out easier; withstands highest pressures, and is unaffected by heat and moisture!
2. KANT-GALL TOOL JOINT COMPOUND
3. LONG-LIFE DRILL COLLAR COMPOUND

SOLD BY SUPPLY STORES EVERYWHERE

PETROLEUM DISTRIBUTING CO.

BOX 203—HOUSTON, TEXAS

Charter 5648

County, North Dakota. The rig to be used is one now on a deep test which this contractor is drilling for Amerada Petroleum Corp. in Williams County, same state. Amerada's test, 1 Schell-Union Pacific, C SW SW 6-155n-95w, at latest report was drilling below 10,500 ft. The Phillips and Carter joint test is 1 Patented in the C NE NW 29-136n-81w.

Ideal Drilling Co., Casper, Wyo., is drilling for Charles D. Edmonson at 1 Zimmerman, a northwest outpost test for the Big Springs field, Deuel County, Nebraska. Location is in the NW NW SE 24-13n-43w. Contract is for 3,620 ft.

Kemp Drilling Co., Inc., Shreveport, has the contract for a projected 11,000-ft. Lower Cretaceous test to be drilled for D. J. Madden about 7 miles southeast of Tylertown, in the NW NW 22-1n-11e, Walthall County, Mississippi.

Dillard & Waltermire, Houston, have a rig running for The Texas Co. in the Sandusky Oil Creek field, 7 miles northeast of Whitesboro, Grayson County, North Texas. Present operation is 1 Anderson, in the E. L. Stickney Survey.

Oil States Drilling Co., contracting for H. S. Moss of Dallas, is starting a 10,750-ft. Devonian test 4 miles northwest of the Bagley-Hightower area, Lea County, New Mexico. Location is in the C. SW SW 32-11s-33e, on a state lease.

Creekmore Drilling Co., Hobbs, N. M., is drilling for Amerada Petroleum Corp. at 1 Adcock, a Pennsylvanian wildcat test in Section 106, Block 34, Township 7n, T&P Survey, 3 miles east of Hyndman, Dawson County, West Texas. Contract is for 10,500 ft.

Ard Drilling Co., Abilene, has moved a rig to a wildcat location 3 miles east of Rotan, in Fisher County, West Texas, where it will drill a 6,200-ft. Ellenburger test for Stanolind Oil & Gas Co. Location for the test, 1 Edwards, is in Section 116, Block 2, H&TC Survey. It is 2 miles southeast of production in the Rotan field.

Atlantic Oil Co., Los Angeles, is the contractor on a wildcat test being started by F. G. Anderson in the Calabasas area, Los Angeles County, California. The test is 1 Mable. Location is in 23-1n-18w.

Western Drilling Co., Longview, Tex., has the contract for the Pennsylvanian wildcat test (1 Jones) which Deep Rock Oil Corp. is starting a mile south of the small, reef-discovery well recently completed by Standard Oil Co. of Texas in Mitchell County, Texas. Location is in Section 61, Block 20, Lavaca Navigation Survey.

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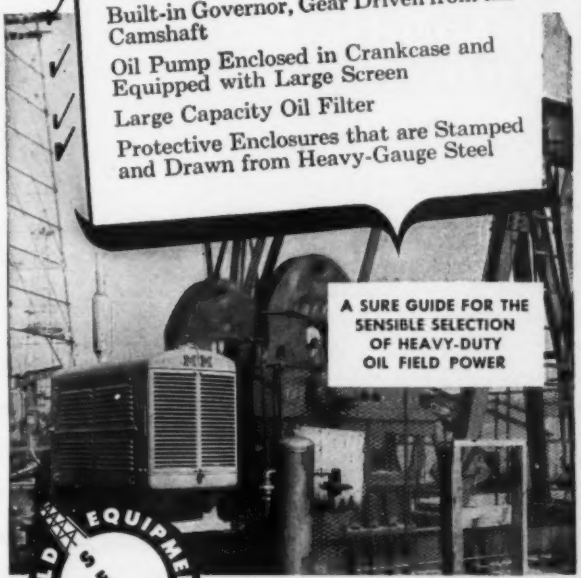

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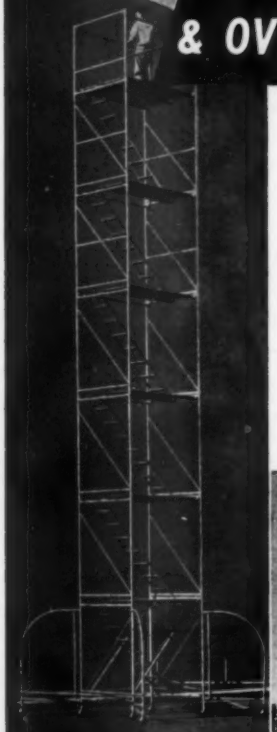

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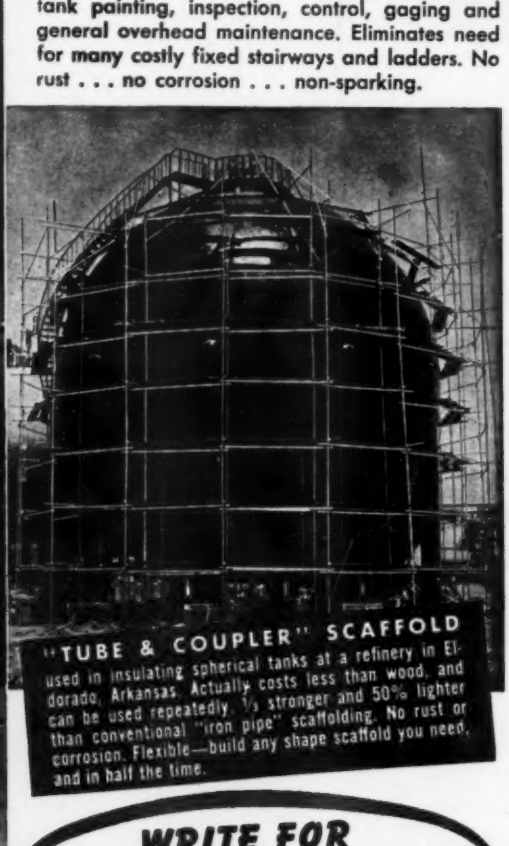

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NATURAL GAS

Records Topple

Revenues, customers, and sales erase former highs

NEW YORK.—The spectacular growth of the natural-gas industry since the end of World War II was particularly emphasized in 1950 when new records were achieved in customers, volume of sales, total revenues, and sales of gas appliances, according to D. A. Hulcy, president of the American Gas Association and of Lone Star Gas Co., Dallas.

Capital expenditures for construction and plant expansion reached a new high level. Transmission and distribution systems of the industry grew to reach an amazing total of 375,000 miles, about equaling the total mileage of the combined oil and railroad systems of the nation.

Customers receiving natural gas numbered 14,894,000, a gain of 12.7 per cent over the previous year. Revenues staged a spectacular rise of 25 per cent to total $1,363,000,000 for the year, and sales were about 3,694,000,000 M.c.f., a gain of 18.9 per cent.

Progress.—In the first 9 months of 1950, the Federal Power Commission approved construction of 5,750 miles of new natural-gas-transmission lines and had applications pending for an additional 12,400 miles. Construction of the approved lines will bring the total mileage of the nation's natural-gas-transmission system to more than 265,000 miles.

Since the end of World War II, the industry has increased in value from $5,000,000,000 to $8,750,000,000. Gas-utility companies still have allocated under their long-range planning more than $2,500,000,000 to be spent in the next 4 years for new construction and expansion of present facilities.

Natural-gas reserves are ample to serve the nation for many years, Hulcy said. This is despite the rapid increase in production and use of natural gas. An American Gas Association committee on reserves estimated at the beginning of 1950 that proved reserves of natural gas totaled 180.3 trillion cubic feet.

Outlook.—Many factors point the way to a continuation in 1951 of the record-breaking achievements of the industry in 1950, Hulcy said. Except for a few areas, the gas-supply problem is being solved rapidly through the growth of natural-gas systems. Rising costs indicate some further rate adjustments may be necessary, particularly if gas-utility tax burdens are increased appreciably.

Shortages of materials resulting from conversion to war production would necessitate delays in construction and expansion programs. Under normal conditions, the gas industry could be expected to continue its gains in 1951, Hulcy said, but present world conditions make it impossible to forecast the future with any degree of certainty.

Natural Absorbs Texoma

WASHINGTON. — The acquisition by Natural Gas Co. of America of all facilities of its affiliate, Texoma Natural Gas Co., has been approved by the Federal Power Commission. Both companies are affiliates of The Peoples Gas, Light, & Coke Co., of Chicago.

Natural and Texoma have operated, under common management, an integrated natural-gas-transmission system and have transported gas from Texas to various points in Illinois, Iowa, Nebraska, and Kansas. Natural has delivered and sold the gas to utilities for resale in numerous communities in these states as well as in Indiana and Wisconsin.

Principal transmission facilities to be acquired by Natural from Texoma under the merger plan include two compressor stations; a 74-mile, 24-in. pipe line; gas leases, rights, and estates in approximately 132,000 acres of land and 231 gas wells located in the Texas Panhandle gas field; a metering station; and a natural-gas-gathering system including booster stations.

Gas Superiority Predicted

BERKELEY, Calif. — Natural gas may soon be more important in the United States than oil, according to James J. Parsons of the University of California.

Parsons estimates that 6 trillion cubic feet were removed from the ground in 1949. Known gas reserves are bigger than oil reserves, he says.

In 1949 the marketed production of gas increased 12 per cent with 8 per cent reduction in oil and 28 per cent reduction in coal.

Industrial Fuel Cutback

CLEVELAND.—A cold-weather rise in the consumption of natural gas in this area has caused East Ohio Gas Co. to request plants with standby facilities to limit their use of the fuel.

The company reported normal supplies and pressures for home heating with no complaints of low pressure from domestic users.

East Ohio attempts to provide year-around service of gas to industrial plants, in contrast with other areas where industrial-gas use is curtailed during winter months, a company spokesman said. The partial curtailment, he said, marks the second time temporary industrial cutbacks were necessary in the Cleveland area this year.

Lynchburg Seeks More Gas

WASHINGTON. — Lynchburg Gas Co., of Lynchburg, Va., has filed a petition with the Federal Power Commission seeking a supply of natural gas from Transcontinental Gas Pipe Line Corp., of Houston. A subsidiary, Lynchburg Pipe Line Co., has asked the FPC for authority to build a 15-mile line connecting the Transcontinental system with the Lynchburg Gas Co.'s distributing facilities.

Virginia Gas Transmission Corp. now supplies gas to Lynchburg Gas, which serves Lynchburg and the adjoining areas of Amherst, Bedford, and Campbell counties of Virginia. The petition claims that Virginia Gas at present cannot supply the full requirements of Lynchburg, and that in recent periods of cold weather Lynchburg has experienced demands on its system as high as 4,900,000 cu. ft. per day. The company estimates its maximum daily requirements of gas from Transcontinental as ranging from 2,000,000 cu. ft. in February 1952 up to 3,000,000 cu. ft. in February 1955.

Lynchburg Pipe Line Co., in a separate application, proposes to construct a 15-mile line from a connection with Transcontinental's main line in Appomattox County, Virginia, west to a point near Lynchburg. Estimated cost is $300,000.

Natural Gasoline

Havenstrite Plant Sold

LOS ANGELES.—Sale of Havenstrite Oil Co.'s natural-gasoline plant at Castaic and its producing properties in the nearby Del Valle field, northern Los Angeles County, was announced here last week. Union Oil Co. acquired the plant for a reported $3,000,000, and Nassau Associates, Inc., a subsidiary of Dillion, Read & Co., bought the properties for $9,000,000.

The Del Valle properties taken over by Nassau amounted to 320 acres containing 26 oil wells, currently producing about 2,000 bbl. daily. Union is expected to start immediately a long-term contract for the purchase of the crude, as it did about a year ago when Nassau purchased the Doheny interests in a Coalinga Nose lease. The deal did not include any other oil properties of Havenstrite.

In the deepest producer east of the Rockies

Shell Oil Company's new deep producer, Well #2, Weeks Gail State Unit 2, Weeks Island Field, Vermilion Bay, Iberia Parish, La.

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Pemex's Exploration Plans for 1951

PETROLEOS MEXICANOS, better known as "Pemex," the principal operator in Mexico's oil industry, has prepared an impressive exploratory program for the new year. The plans developed by this governmental organization range from detailing partially known producing fields to reconnaissance work in virgin areas. The aim of the program is to find sufficient first-class prospects in the more accessible localities to keep ahead of the organization's accelerated development program.

Mexico, which last year produced 70,000,000 bbl. of oil and distillate, has consistently increased her production since 1942 when total oil production had declined to 35,000,000 bbl. This remarkable increase in production and the participation of additional private capital in the Mexican oil industry have revived interest in this essentially untested country.

The shaded areas on the accompanying sketch map indicate Mexico's potential oil-producing territory. Very little is known of the geology of these enormous areas. The solid splotches on the map are roughly the areas in which Pemex is going to concentrate its exploratory efforts this year. Last year plans called for 29 exploration parties, but during the year this number was increased until the present program calls for 44. Included are geophysical parties, especially seismograph, surface geologists, and subsurface geologists to sit on the 60 to 80 wildcats that are planned to be drilled with the 20 rigs available for this purpose.

The exploration program may be divided into two parts. One, in areas known to be oil-bearing, and the other, in areas that so far have not produced oil.

On the map, A, B, and C are provinces in which oil is produced. "A" is known as the Bajo Rio Bravo basin. Very little detailed work has been done in this basin but numerous possibilities from the Miocene through the Cretaceous are believed to exist. "B" is the Tampico-Tuxpan-Poza Rica basin, the most prolific producing area in Mexico. Recent discoveries have proven that conditions responsible for existing fields are more general than once believed and detailed work will concentrate on locating extensions and new fields. "C" locates the Saline-Tabasco basin area. A few piercement-type salt domes have been found in the western portion of this dual basin but a great deal more work is needed to locate the additional Miocene sand accumulations that are undoubtedly present.

The unproductive areas to be tackled by Pemex are marked "D" to "H" on the map. In northern Chihauhau (D) there is a great development of marine Jurassic and Cretaceous sediments which rest on Paleozoics. Jurassic and Cretaceous sediments are also found in the wide valley (E) between the foot of the Sierra Madre Oriental and the sierras of Tamaulipas and San Carlos. Little is known of either of these areas but Pemex considers them worthy of intensive checking.

The Vera Cruz basin (F) is principally covered by recent alluvium, dense vegetation, and volcanics. The similarity of this basin with oil-producing basins along the eastern coast of Mexico make it extremely attractive. Exploration in this area has been retarded by natural obstacles that make the work costly.

Gravity work has indicated that faults not reflected in the surface formations exist in the area at the base of the Peninsula of Yucatan (G). The great development of Tertiary sediments in northern Chiapas (H) will be studied on the plains and in the foothills.

Philip C. Ingalls

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Continental Oil Co. found shows of gas in the Paradox at its 1 Unit, Nucla, Colorado, wildcat and is drilling ahead in that formation. At the first deep test in Thornburg field, Moffat County, Colorado, Continental apparently has a new pay gas discovery in the Weber at the 1 Lewin. Morton Oil Co. tested oil on a ½-mile northeast extension in the Clareton area, Wyoming. The well, 1 Van Herwynen, found oil in the Newcastle.

MISSISSIPPI.—Helis and Danciger have an apparent Wilcox strike in Adams County. The team's B-1 Armstrong, 19-5n-2w, had shows in the Sparta and Wilcox and recovered 42.5°-gravity oil on a drill-stem test run at 6,316 ft. The new sand strike is about 1,850 ft. from an unsuccessful test drilled by the same operators.

CANADA.—Socony-Vacuum 29-14 Duhamel, LSD 14, 29-45-12w4, has tested 142 ft. of water-free D3 productive zone. The well topped the D3 at 4,698 ft., and on drill-stem tests flowed oil at the rate of more than 1,700 bbl. daily.

WEST TEXAS.—Sinclair Oil & Gas Co. has a new Pennsylvanian prospect in Upton County, 7 miles south of the company's recent Davis discovery, and 4 miles still further south of Pegasus field. The well, 1 McElroy Ranch Co., recovered 56 bbl. of oil on a 1-hour gage on drill-stem test at 9,376-9,411 ft.

TEXAS GULF COAST.—Texas Co.'s 4 Williams has opened a new oil area in Liberty County. The well flowed more than 211 bbl. of 32.3°-gravity crude per day.

North Central Texas

Stonewall County Wildcat To Get Canyon Completion

WICHITA FALLS.—DeSoto Oil Co. 1 Guest, Stonewall County wildcat south of Aspermont, found gas, oil-cut mud and salt water on its first test in the Ellenburger from 6,375-98 ft., and was to be plugged back for completion attempt in Canyon sand.

The Ellenburger test was open 40 minutes, and recovered 30 ft. of gas, 180 ft. of oil-cut mud and 190 ft. of salt water. Previously the well had recovered free oil on several tests from pay sand from 4,534-60 ft.

Seven miles northeast of Weinert, Riley Maxwell 1 Hester, Haskell County Caddo discovery, made a pumping potential of 134 bbl. of 37°-gravity oil a day from perforations from 5,302-12 ft. Top of the Caddo was 5,304 ft.

Southwest of Longworth in Fisher County, Lion Oil Co. 1 Huddleston was running pipe after finding the pre-Cambrian around 5,941 ft. The well had oil and gas on drill-stem tests of the Mississippian.

Atlantic Refining Co.'s 1 W. J. Bryan, wildcat northwest of Hamlin in Fisher County, was drilling ahead below 3,997 ft. after finding salt water in the Swastika sand from 3,722-39 ft.

Sun and Seaboard 1 Paramore, Nolan County wildcat 3 miles northwest of their 1 Maddox, Ellenburger discovery, was showing for a discovery or extension. The well had total depth at 7,391 ft., apparently in the Ellenburger, and on a drill-stem test was variously reported to have flowed 48 to 88 bbl. of oil a day with no water, through 13/64-in. choke.

Confirmation production for the new North Knox City field of Knox County has been established at Stanolind Oil & Gas Co. 2 Icelena Clonts, a southwest step-out from the discovery, which is about 5 miles northeast of Knox City. Potential on the second well was 110.4 bbl. of oil a day, flowing naturally through 11/64-in. choke. The new wells are the first Palo Pinto producers for the county.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: L. T. Burns 1 J. L. Anderson, Blk. 19, South Anderson Ranch Subd., 4 mi. NE Megargel, NE offset 4 Bishop, Strawn discovery; TD 5,118 ft., Mississippian pay 5,072 ft., flowed 148.8 bbl. 43°-gravity oil in 8 hr., 16/64-in. choke, TP 130 psi., GOR 630 cu. ft.

Clay County: Gulf Oil Corp. 60 Earl Spring, 34-4-H&TC, 4 mi. SW Ringgold, TD 6,000 ft., PB 4,875 ft., Strawn (?) pay 4,860 ft., pumped 13 bbl. 47°-gravity oil.

Comanche County: Trumpter Petroleum Corp. 1 E. H. Allen, W. H. Farmer Sur., 1 mi. S Engery, TD 2,711 ft., perf. limestone 2,674-84 ft., 4,800,000 cu. ft. gas a day, shut-in pressure 1,157 psi.

Fisher County: Texas Pacific Coal & Oil Co. 1 V. P. Toler, 202-1-BBB&C, 5 mi. NW Hamlin, TD 6,053 ft., elev. 1,803 ft., PB 3,820 ft., Swastika 3,766 ft., perf. 3,773-84 ft., flowed 91 bbl. 40°-gravity oil a day, ½-in. choke, GOR 6,020 cu. ft., TP 115 psi.

Hamilton County: Amerada Petroleum Corp. 1 Alice D. Cowling, John Person Sur., 5 mi. W Hamilton, TD 3,740 ft., PB 3,240 ft., Marble Falls 3,164 ft., perf. 3,180-3,255 ft., 3,000,000 cu. ft. gas.

Jack County: Warren Oil Corp. 1 T. H. Cherry holmes, MEP&P Sur., A-420, 6 mi. SE Jacksboro, TD 4,718 ft., conglomerate pay 4,707-18 ft., flowed 395 bbl. 40°-gravity oil a day, ¾-in. choke, TP 60 psi., GOR 339 cu. ft.

Montague County: W. T. Waggoner 1 Paine McGaw, Wm. Ainsworth Sur., A-1, 4 mi. W Nocona, TD 5,587 ft., elev. 854 ft., Strawn pay perf. 4,616-78 ft., flowed 62.5 bbl. 42°-gravity oil in 4 hr., ⅜-in. choke, GOR 400 cu. ft., TP 200 psi.

Shackelford County: McElroy Ranch Co. 1 L. A. Sanders, Sec. 819, TE&L Sur., 6 mi. E Albany, TD 4,559 ft., elev. 1,327 ft., Ellenburger pay 4,548 ft., flowed 75 bbl. 41°-gravity oil a day, some water.

Throckmorton County: J. H. Snowden 1 G. H. Bachman, Sec. 3,073, TE&L Sur., 3 mi. NE Throckmorton, TD 4,349 ft., Caddo 4,342 ft., flowed 89.66 bbl. 39°-gravity oil a day, 12/64-in. choke, TP 500-320 psi.

Wise County: Continental Oil Co. 1 Bertha Flowers, W. S. Blount Sur., 7½ mi. SW Bridgeport, TD 6,951 ft., PB 6,600 ft., conglomerate pay 5,026 ft., 1,293,000 cu. ft. gas.

Young County: R. C. Lipscomb 1-A Furr & Allar Co., Blk. 352, TE&L Sur., 3½ mi. NW Newcastle, TD 4,692 ft., elev. 1,159 ft., Mississippian 4,684 ft., pay 4,679 ft., flowed 110 bbl. 42°-gravity oil a day, 7/64-in. choke, GOR 440 cu. ft., TP 750 psi.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: C. E. Morrison 1 Grady Bars, John W. Harris Subd., Club Ranch Sur., 5 mi. NE Archer City, dry, TD 5,137 ft.

An-Son Petroleum Co. 1 J. R. Parkey Sur., A-423, 3 mi. SE Mankins, dry, TD 4,508 ft.

W. T. Graham 1-A Lyles, Sec. 7, Hooper & Wade Sur., 6½ mi. SW Mankins, dry, TD 4,364 ft.

Rycade Oil Corp. 2 Hayter, G. W. Stell Sur., A-382, 7 mi. NE Megargel, dry, TD 5,346 ft. in cherty lime.

Brown County: Louis Guarcello 1 J. H. Ehrke, David Cole Sur. 81, 3 mi. E Owens, dry, TD 1,510 ft., Marble Falls 2,100 ft.

Callahan County: McGarth & Coleman 1 Blan Odom, Sec. 15, BBB&C Sur., 7 mi. S Clyde, dry, TD 1,130 ft.

United North & South Development Co. 2 Weldon Edwards, BBB&C Sur. 14, 8 mi. SW Clyde, dry, TD 1,775 ft.

Clay County: Republic Natural Gas Co. 1 H. Sanzenbacher, Blk. 31, Grayson CSL, 4 mi. NE Bluegrove, dry, TD 6,506 ft., Caddo 5,776 ft., Barnett 6,022 ft.

S. D. Johnson 1 W. H. Vieth, 8-2-Clark & Plumb, 7 mi. W Deer Creek, dry, TD 4,133 ft.

Cooke County: T. P. Frost 1 Ramsey, B. Lusk Sur., 10 mi. N Muenster, dry, TD 1,335 ft.

W. A. Lofton and Alton Hanes 1 J. G. Cannon, F. Johns Sur., 9 mi. NE St. Jo, dry, TD 1,372 ft., oil sand 1,308-42 ft.

Oil Hunters, Inc. 1 A. L. Wooten, C. Yarbrough Sur., 2 mi. W Tioga, dry, TD 3,297 ft., Ellenburger 3,280 ft.

Coleman County: J. W. Reneau 1 Weley Kile, Sec. 105, ETRR Sur., 14 mi. S Coleman, dry, TD 728 ft.

B. R. Sheffield et al 2 V. E. Yancy, Wm. Doran Sur. 666, 1¼ mi. SW Santa Anna, dry, TD 1,881 ft.

Brannon & Murray 1 R. H. Cochran, McCord & Lindsey Sur. 711, 3 mi. NW Coleman, dry, TD 2,930 ft., Morris sand 2,465 ft., Gray 2,685 ft.

Glass-Hagan Drilling Co. 1 Hayes, C. Requet Sur. 43, 1 mi. W Santa Anna, dry, TD 1,937 ft., Fry sand 1,934 ft.

Texas Pacific Coal & Oil Co. 1 A. M. Norris, 150-1-GH&H, 2 mi. SW Voss, dry, TD 3,395 ft., Gunsight 1,474 ft., Winchell 1,880 ft., Marble Falls 3,092 ft., Ellenburger chert 3,181 ft., dolomite 3,194 ft.

Comanche County: Lloyd H. Smith, Inc. 1 Gail Dudley, Sec. 21, HT&B Sur., 3 mi. NW Mercers Gap, dry, TD 2,684 ft., elev. 1,832 ft., Marble Falls 2,400 ft., Ellenburger 2,638 ft.

Eastland County: Elliott & Reed Drilling Co. 1 W. D. Hooper, 79-3-H&TC, 9 mi. S Cisco, dry, TD 3,948 ft., Ellenburger 3,895 ft.

Joe G. Lane 1 C. D. Lane, S. H. Hines Sur., 2 mi. SW Pioneer, dry, TD 3,195 ft., Gray lime 3,175 ft., Caddo 2,530 ft.

Haynes B. Ownby Drilling Co. 1 Mrs. Effie Brown, 110-3-H&TC, 6 mi. SW Cisco, dry, TD 3,874 ft., Caddo 2,852 ft., Ellenburger 3,898 ft.

Eastland County: J. S. Lewis 1 Gordon Woods, 55-4-H&TC, 6 mi. NW Eastland, dry, TD 3,397 ft., PB 1,760 ft., elev. 1,486 ft., Caddo 3,163 ft., Lake sand 3,350 ft.

Haskell County: Anderson Prichard Oil Co. 1 J. W. Peace, S. McFerron Sur. 133, 2 mi. NW Weinert, dry, TD 5,678 ft., Dothan 1,870 ft., Bunger 3,005 ft., base Canyon 3,610 ft., Caddo 5,415 ft.

Jack County: Fowler Farm Oil Corp. 1 Sofie Hoefle, Asberry James Sur., 4 mi. SE Antelope, dry, TD 2,772 ft.

Jones County: S. C. Herring 1 A. M. Downey, Sec. 6, Lge. 359, Goliad CSL, 3 mi. SE McCauley, dry, TD 3,590 ft., Flippen 2,957 ft.

Robinson-Puckett, Inc. 1 Blanch Smith, 15-1-T&NO, N edge Anson, dry, TD 4,360 ft.

Ungren & Frazier 1 A. L. McKeever, Sec. 47, OAL Sur., 4 mi. E Anson, dry, TD 2,632 ft.

Knox County: Hiawatha Oil & Gas Co. 1 Fant Estate, Sec. 5, GC&SF Sur., 10 mi. W Benjamin, dry, TD 6,501 ft., Canyon 4,114 ft., Ellenburger 6,450 ft.

Shackelford County: Fred M. Manning, Inc. 1-C Paul Pitzer, Sec. 509, TE&L Sur., 7½ mi. NE Albany, dry, TD 4,651 ft., Caddo 3,873 ft., Ellenburger 4,612 ft.

Stephens County: McCotter & Urban 1 Graham, 89-4-T&P, 8 mi. SE Frankel, dry, TD 1,846 ft.

Throckmorton County: Pan American Production Co. 1 H. C. King, Sec. 232, BBB&C Sur., 5 mi. NW Throckmorton, dry, TD 4,212 ft., Caddo 4,564 ft., Mississippian 5,102 ft.

Young County: Rankin-Pitcock-Plummer 1 B. W. King, J. Pointevent Sur., 7 mi. NE Graham, dry, TD 4,072 ft.

Tres Oil Co. 1 J. C. Bloodworth, Blk. 233, TE&L Sur., 2½ mi. SE Olney, dry, TD 1,075 ft.

South Louisiana

Gulf Opens New Oil Field on Wilcox Trend

NEW ORLEANS.—On the Wilcox trend, Gulf Refining Co. has opened a new field in the South Big Island area of northern Avoyelles Parish. Their 2 Ben J. Altheimer et al, in Section 24-4n-4e, on a 12-hour test, tested 63 bbl. of 30°-gravity oil a day plus 30 per cent water through a ⅛-in. choke from casing perforations at 4,446-48 ft. Gas-oil ratio was 365-1.

Production test was being made late in the week at a Calcasieu Parish wildcat 1½ miles northwest of the Vinton dome and the same distance southwest of the town of Vinton. Sun Oil Co. 1 Brooks set 5-in. liner to 11,002 ft., and will be perforated for completion attempt.

The third deepest oil producer in the nation was recorded this week. Magnolia Petroleum Co. 1 Doornbos-McPherson N-1, Wilcox discovery in the Hurricane Creek field, produced 1,500 bbl. of 55°-gravity oil per day through 12/16-in. and 15/64-in. chokes, with a gas-oil ratio of 2,498-1. Casing was perforated from 14,530-73 ft.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Acadia Parish: Oil discovery—Bates & Cornell 1 August Leonards, 29-7s-1e, TD 9,976 ft., perf. 9,953-69 ft., IP: 330 bbl. oil per day, 14/64-in. choke, TP 3,100 psi., 44.4° gravity.

Avoyelles Parish: Oil discovery—Gulf Refining Co. 2 Ben J. Altheimer, et al, 24-4n-43, TD 6,518 ft., perf. 4,442-44 ft., IP: 63 bbl. oil per day, ⅛-in. choke, 30° gravity.

SOUTH LOUISIANA WILDCAT FAILURES

Acadia Parish: Jake L. Hamon & Edwin B. Cox 1 Daigle, 83-8s-2e, dry, TD 11,830 ft.

Rapides Parish: J. B. Fletcher 1 Wettermark, 78-5n-3w, dry, TD 6,990 ft.

St. Mary Parish: Dave Haas, et al, 1 Paul Joubert, 42-5s-3e, dry, TD 12,010 ft.

Vermilion Parish: A. Delcambre, Jr., 1 Avery Boullion, 49-13s-4e, dry, TD 2,105 ft.

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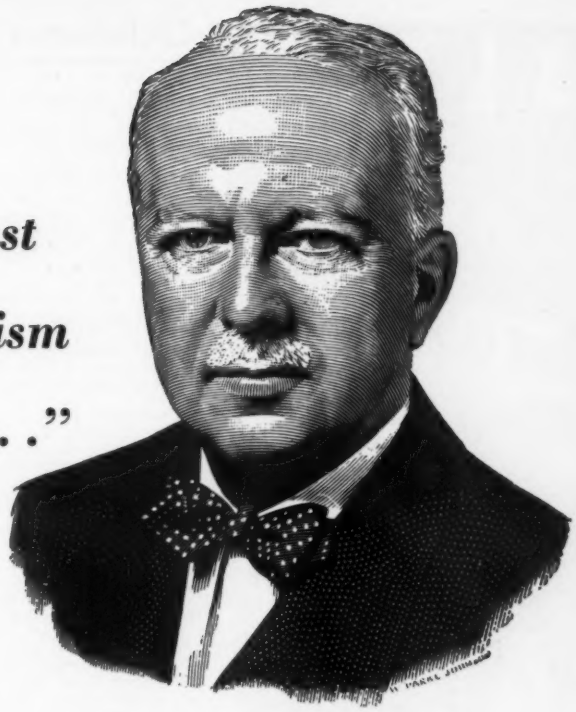

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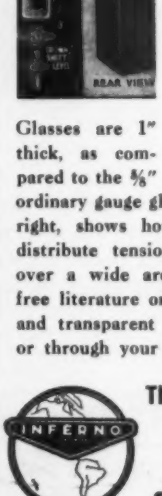

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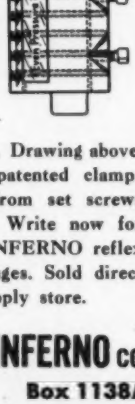

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Oklahoma

Oil Producer Confirms Northeast Carney Pool

WILCOX OIL CO. has completed a good oil producer in its second well for the recently opened Northeast Carney pool, Lincoln County. Its 1 Kinder, NW NE SE 28-16n-3e, approximately ½ mile southeast of its 1 Potter, the discovery well, completed as a gas producer, flowed 400 bbl. of clean 46° oil through ¼-in. choke on a 24-hour production test. In the first hour after being turned into the tanks it flowed 70 bbl. through ½-in. choke. During the second hour, with flow restricted to ⅜-in. choke it made 32 bbl., flowing pressure was 380 psi.

Productive horizon is the Hunton lime, the same as in the discovery well. Casing is perforated at 4,783½-85 ft. Top of the Hunton is 4,779 ft. Hole was drilled to a total depth of 4,860 ft. and casing run through the zone to 4,853 ft. The discovery well, which flowed more than 6,000,000 cu. ft. of gas daily, is perforated at 4,760-80 ft.

The area is about 2 miles northeast of Carney and about the same distance southwest of Tyron.

Newton Barrett and Grady Musgrave 1 Guderian, SE NE NW 12-10n-4e, which is opening a promising new Wilcox sand pool about 3 miles east and a little north of Shawnee, Pottawatomie County, made 150 bbl. of oil in 12 hours on initial swabbing tests. Production was natural from open hole at 4,837-59 ft.

Tide Water Associated Oil Co. is continuing tests of various promising zones in its 1 Myers, NE NE NW 10-4n-11w, prospective discovery well in northern Comanche County, southwestern Oklahoma. Following a succession of tests in Arbuckle from which it flowed gas at rates up to 3,000,000 cu. ft. per day, well has been plugged back to Bromide, which, on drill-stem tests, showed good oil production. Casing has been perforated in the latter formation at 1,542-60 ft., and with tubing run, operators at latest report were preparing to swab. Bromide was topped at 1,509 ft. with the entire Pennsylvanian section missing. Total depth is 4,071 ft. Arbuckle was found at 3,440 ft.

Bay Petroleum Corp. got a good Deese sand well off the northeast flank of the Northeast Doyle pool in northeastern Stephens County. Its 1 Payne, SW SW SW 1-1n-5w, with casing perforated at 6,715-50 ft. and 6,795-6,845 ft., flowed 125 bbl. of oil per hour and 1,500,000 cu. ft. of gas per day through ½-in. choke. Pinched to 20/64-in. choke, it flowed 25 bbl. of oil per hour until shut in for additional tankage. The well had been started as a Springer sand test, and then was drilled to a total depth of 8,372 ft. in Mississippian. Springer and Mississippian failed to show commercially and the hole was plugged back to the present producing zone in the Pennsylvanian.

OKLAHOMA SUCCESSFUL WILDCAT

Texas County: American Gas Producing Co. 2 Stonebraker, NW NW SE 20-3n-13ecm, 15,000,000 cu. ft. of gas, open flow, from regular Hugoton pay at 2,654-78 ft., 2,618-50 ft., and 2,586-2,600 ft., TD 2,743 ft.

OKLAHOMA WILDCAT FAILURES

Coal County: W. A. Delaney, Jr., 1 King, SE NW SE 27-2n-8e, dry, TD 1,432 ft., sand 1,329 ft.

Comanche County: Harper-Turner 1 Daily, NW NE NE 9-1n-9w, elev. 1,172 ft., dry, TD 2,810 ft., base Pennsylvanian-top Arbuckle 2,632 ft.

Honnell and Strauss 1 Weber, SE SE NE 34-4n-12w, dry, TD 164 ft.

Creek County: Vise et al. 1 Estate Land Co., NE NW SW 29-17n-8e, dry, TD 3,030 ft.

Burgin and Continental Prod. 1 Orphanage, SE NE NW 4-19n-7e, dry, TD 2,740 ft., Layton 1,677 ft., Checkerboard 1,955 ft., conglomerate 2,020 ft., Big Lime 2,388 ft., Oswego 2,486 ft., Prue 2,504 ft., upper Skinner 2,570 ft., Verdigris 2,550 ft., middle Skinner 2,610 ft., lower Skinner 2,653 ft., Red Fork 2,731 ft.

Texas Co. 1 McElroy, SE NE SE 21-19n-7e, dry, TD 3,338 ft.

Lincoln County: Harper-Turner 1 Matsinger, SW SW NW 15-16n-3e, elev. 970 ft., dry, TD 4,746 ft., Hogshooter 3,109 ft., Checkerboard 3,382 ft., Oswego 3,897 ft., Verdigris 4,058 ft., Skinner 4,072 ft., Red Fork 4,185 ft., Inola 4,215 ft., Bartlesville 4,267 ft., Mississippi lime 4,482 ft., Woodford 4,611 ft., Hunton 4,654 ft., Sylvan 4,684 ft.

McIntosh County: McCasland 1 Douglass, NW NW SE 1-12n-16e, dry, TD 3,145 ft., Dutcher lime 1,700 ft., first Dutcher sand 1,802 ft., second Dutcher sand 2,196 ft., Morrow 2,410 ft., Mississippian 2,488 ft., Hunton 2,998 ft., Sylvan 3,020 ft., Viola 3,066 ft., Wilcox 3,111 ft., geological wildcat.

Pawnee County: Anderson-Prichard 1 Pappan, NW NW NW 28-24n-4e, est. elev. 1,022 ft., dry, TD 2,571 ft., upper Layton 2,443 ft., lower Layton 2,480 ft.

Stephens County: Sutton 1 Hay, SE SE NW 15-1n-9w, elev. 1,150 ft., dry, TD 2,900 ft., Arbuckle 2,805 ft.

Fletcher et al. 1 City of Comanche, NE SW SW 13-2s-7w, elev. 1,058 ft., dry, TD 4,005 ft., Hoxbar 2,095 ft., lime 2,302 ft., sand 2,351 ft. and 2,533 ft., lime 3,227 ft., 3,245 ft., and 3,264 ft., Simpson shale 3,611 ft.

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Texas Gulf Coast

Liberty County Strike Features Coastal Work

HOUSTON.—A new oil field 2 miles north of North Dayton field of Liberty County was recorded this week by The Texas Co. Its 4 J. D. Williams, located on a 320-acre lease in the H&TC RR Survey, Section 123, flowed at the rate of 211.03 bbl. of 33.3°-gravity oil per day through a 10/64-in. choke on official state potential. Gas-oil ratio was 330-1. Tubing pressure was 650 psi. An open-hole completion was made after drilling to a total depth of 5,050 ft. in cap rock and setting 7-in. pipe at 5,041 ft.

Significance of this discovery is that it appears to be separated from the rim production from the main dome mass 2 miles to the south. The new well scales 900 ft. from the north line and 1,050 ft. from the west line of the survey. It is also 781 ft. northwest of same interests 3 J. D. Williams, 1,650 ft. from the west line and 1,238.8 ft. from the south line of the tract, which was completed on October 31, 1950, for an open flow of 20,000 M.c.f. through casing perforations at 2,136-46 ft., or nearly 2,900 ft. shallower than the oil pay. Shut-in pressure was 1,071 psi.

Meanwhile, same interests spudded in this week on a 10,500-ft. test on the southeast flank of North Dayton dome. Their "B"-1 Deering et al is located on a 130-acre lease in the E. D. Pruitt Survey, Abstract 488.

The north flank of Boling dome in Fort Bend County received an abandonment. D. M. Wallace, et al, plugged their 1 Pleasants, after drilling to a total depth of 3,801 ft., with no commercial shows. It is on a 172-acre lease in the D. W. Anthony ¼ League.

On the north flank of Batson field in Hardin County, Stanolind Oil & Gas Co. was preparing to run electric log at 1 Kirby Lumber Co., a wildcat on a 162-acre lease in the Hardin County School Land Survey, Abstract 260, 3 miles northeast of Batson. Present total depth is 6,714 ft. Earlier log was run to 6,636 ft. and a few oil showings were reported from side-wall cores below 6,300 ft.

Wharton County received an abandonment at a wildcat located 2½ miles southeast of Lane City. Lloyd H. Smith 1 S. W. Child, on a 119.6-acre lease in the N. B. Williams Survey, reported showings after drilling to a total depth of 7,615 ft. and running electric log to 7,517 ft.

Buna area of Jasper County received another abandonment. Placid Oil Co. plugged its 5 J. S. Richardson heirs, a wildcat on a 1,326.3-acre lease in the T&NO RR Co. Survey, Section 90, Abstract 852. No oil or gas showings were logged in drilling to a total depth of 7,885 ft.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCAT

Victoria County: New pay at Placedo—Sunray Oil Corp. 4 Lad Marek, William Rupley Sur., A-400, 2 mi. SE of Placedo, TD 5,780 ft., perf. 5,736-42 ft., IP: 111 bbl. oil per day, 8/64-in. choke, 34.4° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: H. R. Smith and John C. Orgain 1 A. C. Jones, James Hefferman Sur., A-31, 1 mi. NE of Beeville, dry, TD 3,809 ft.

Fort Bend County: D. M. Wallace, et al, 1 Pleasants, D. W. Anthony ¼ League, N flank of Boling Dome, dry, TD 3,801 ft.

Harris County: Natural Gas & Oil Corp., et al, 1 Mabel C. Saunders, Witt, Stable, & Wall Sec. 6, A-1,504, dry, TD 7,562 ft.

Live Oak County: H. A. & M. B. Johnson 1 L. S. Adams, E. Arnold Sur., 16 mi. SW of Three Rivers, dry, TD 1,530 ft.

Montgomery County: Carlton D. Speer, Jr., et al, 1 T. S. Foster Estate, Jose Maria de la Garza Sur., dry, TD 5,020 ft.

Orange County: Sun Oil Co. 1 Henderson, Benjamin P. Gates Sur., A-88, dry, TD 10,025 ft.

Refugio County: Hawn Bros., et al, 1 T. P. Shelly, John Shelly Sur., A-67, dry, TD 6,005 ft.

Wharton County: W. A. Clarke, Jr., 1 Ben Labay, I&GN RR Sur. 14, A-235, dry, TD 4,028 ft.

Lloyd H. Smith 1 S. W. Child, N. B. Williams Sur., A-352, dry, TD 7,615 ft.

Appalachian Field

North-Central Pennsylvania Section Has Four Starts

PITTSBURGH.—In north central Pennsylvania, C. L. Fralich et al completed 2 Walter Diebler, in Wharton Township, Potter County, elevation 1,040 ft., Onondaga lime 5,354 ft., Oriskany sand 5,365 ft., gas at 5,376 ft., testing 2,700,000 cu. ft., rock pressure 2,875 psi., total depth 5,382 ft. Four new locations have been started in this section: Kiski Rod and Gun Club 1 fee, Stewartson Township, Potter County, Short Run Quadrangle; New York State Natural Gas Corp. N-210 Alex Kelly and N-211 Lewis S. Kunkle, et al, Leidy Township, Clinton County, Tamarack Quadrangle; and Godfrey L. Cabot, Inc. 1 H. Fisher Heirs, in the same township, Hammersley Fork Quadrangle.

Two new locations were reported in Southwest Pennsylvania: Young Township, Indiana County, and Loyalhanna Township, Westmoreland County.

West Virginia.—In Sherman district, Calhoun County, West Virginia, Scott Duffield completed a good shallow sand gas well, the 1 Mary Faulkner, gaging 1,078,000 cu. ft. in the first salt sand, total depth 1,653 ft.

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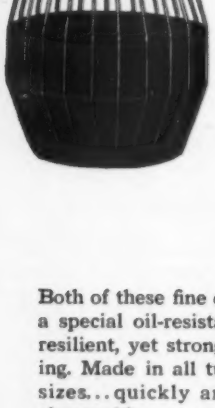

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Kansas

Pawnee County Wildcat Gets Lansing Oil Show

STANOLIND OIL & GAS CO. has a prospective Lansing discovery in eastern Pawnee County, in the western part of the state, at its 1 Evers, NE NW NE 1-22-16. Five miles from nearest oil production, the well filled 540 ft. of oil and gas-cut mud in a drill-stem test with tester open 60 minutes. Test was of an interval at 3,523-55 ft. with Lansing topped at 3,488 ft. (—1,510 ft.). There was no indication of water. Bottom-hole pressure was 950 psi. A 60-minute test of a lower zone at 3,660-68 ft. showed salt water, however, and hole at latest report was being deepened to the Arbuckle. Location is about 3 miles east of Larned.

W. L. Hartman is preparing to test his 1 Werner, SW NW NW 30-19-11, a wildcat just north of Ellinwood, Barton County, where promising oil showings were encountered in both the Lansing and the Arbuckle. A 30-minute drill-stem test at 3,090-3,110 ft. in Lansing, topped at 3,088 ft. (—1,289 ft.), yielded 270 ft. of oil-cut mud. Arbuckle was drilled from 3,392 ft. (—1,593 ft.) to 3,400 ft., and casing run to 3,394 ft. Location is 1½ miles north of production in the Silica pool and about the same distance east of the North Hammer pool.

Barton County added a new pool during the week with official completion of Derby Oil Co. 2 Curtis, NW NW SE 7-17-14, which was given a potential rating of 443 bbl. per day. Production is from Arbuckle lime, topped at 3,407 ft. (—1,489 ft.). Total depth is 3,414 ft. with hole open below 3,408 ft. Location is only ¾ mile southeast of the Leoville pool, but is separated from that pool by a dry hole. The pool has been designated as Southeast Leoville.

First Arbuckle production for the Ely pool, Russell County, has been opened with the completion of a maximum well (potential 3,000 bbl. per day) by Lee Phillips of his 1 Ross, SE SE SW 11-15-13. The well also extends production of the pool ½ mile to the east. Top of the Arbuckle is 3,286 ft. (—1,461 ft.) with hole at 3,289-92 ft.

Skelly Oil Co. is completing a second well for its recently opened McKinney gas pool in southwestern Meade County, in the southwestern part of the state. The confirmation well is 1-B McKinney, SW SW NE 35-33-26, about ½ mile north of the discovery well. It flowed 9,950,000 cu. ft. per day after 8,000 gal. of acid has been pumped to the formation with hole plugged back to 5,708 ft. Total depth was 6,067 ft. with casing at 5,623 ft. Prior to plugging back and before acidizing, the well made an estimated 2,000,000 to 3,000,000 cu. ft. of gas per day with about 5 bbl. of water per hour. Pay zone is the Mississippian.

Laura Jane Oil Co. 1 Seward, SE SE SE 4-28-5, 1½ miles north of the Landssdown pool, eastern Kingman County, flowed at an estimated rate of 5,000,000 cu. ft. of gas per day and recovered 68 ft. of gas-cut mud in a 15-minute drill-stem test of the Mississippian dolomite. Top of the dolomite is 3,796 ft. (—2,368 ft.) with total depth at 3,814 ft. Casing has been run to bottom and will be perforated for the completion.

KANSAS SUCCESSFUL WILDCATS

Barton County: Derby 2 Curtis, NW NW SE 7-17s-14w, elev. 1,915 ft., pumped 443 bbl. oil per day from Arbuckle at 3,408-14 ft., TD; anhydrite 908 ft., Topeka 2,867 ft., Heebner 3,103 ft., Toronto 3,119 ft., Douglas 3,133 ft., Lansing-Kansas City 3,166 ft.

Alpine 1 Connett, NE NE SW 15-19s-12w, elev. 1,859 ft., pumped 104 bbl. oil per day from conglomerate at 3,442-52 ft., TD; anhydrite 680 ft., Kansas City 3,162 ft., Sooy 3,435 ft.

Rice County: Lebsack et al., 1 Munyon, NE NE SW 34-18s-10w, elev. 1,731 ft., pumped 204 bbl. oil per day from Arbuckle at 3,275-81 ft., TD; anhydrite 435 ft., Heebner 3,781 ft., Lansing-Kansas City 2,919 ft.

Russell County: Phillips & Hanson 1 Ross, SE SE SW 11-15s-13w, elev. 1,823 ft., pumped 3,000 bbl. oil per day from Arbuckle at 3,288-91 ft., TD; Topeka 2,672 ft., lime 2,984 ft., Lansing-Kansas City 3,000 ft.

Stafford County: Champlin 1 McGinty, SW SE NE 13-21s-14w, elev. 1,918 ft., pumped 101 bbl. oil per day from 3,503-13 ft., TD 3,680 ft., Heebner 3,221 ft., Lansing-Kansas City 3,352 ft., Viola 3,586 ft., Simpson 3,617 ft., Arbuckle 3,676 ft.

New pay in Silver Bell: Ferrell 2 Hahn, SE NW SW 10-22s-13w, elev. 1,893 ft., pumped 13 bbl. per day from Lansing-Kansas City at 3,498-3,510 ft., TD 3,790 ft., Arbuckle 3,778 ft., old well worked over.

KANSAS WILDCAT FAILURES

Barton County: Todd & Henderson 1 Ehly, SE SW NW 4-18s-11w, elev. 1,802 ft., dry, TD 3,371 ft., anhydrite 630 ft., Heebner 2,905 ft., lime 3,013 ft., Lansing-Kansas City 3,029 ft., Arbuckle 3,344 ft.

Butler County: Wixson et al., 1 Wilson, NW NE NW 30-24s-5e, dry, TD 2,761 ft., Mississippi lime 2,716 ft., Kinderhook 2,755 ft., Viola 2,760 ft.

Nadel & Gussman 1 Elmore, SW SW NW 34-25s-6e, elev. 1,383 ft., dry, TD 2,786 ft., Mississippi lime 2,776 ft.

Chase County: Aladdin and Carlock 1 Noller, NW SW NE 21-21s-8e, elev. 1,517 ft., KB, dry, TD 3,361 ft., Lansing-Kansas City 1,717 (?) ft., base Ft. Scott 2,327 ft., Mississippi chert 2,654 ft., Kinderhook 3,005 ft., Hunton 3,114 ft., Arbuckle 3,255 ft.

Ellis County: Francis 1 McKitrick, NW NW SE 9-12s-16w, elev. 1,876 ft., dry, TD 3,468 ft., anhydrite 1,040 ft., Heebner

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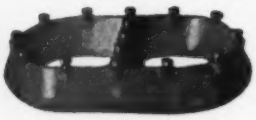

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3,059 ft., Toronto 3,079 ft., Lansing-Kansas City 3,105 ft., Arbuckle 3,464 ft.

Phillips & Hanson 1 Miller, SW NE SW 14-12s-17w, elev. 2,156 ft., dry, TD 3,843 ft., Heebner 3,367 ft., Toronto 3,388 ft., Lansing-Kansas City 3,412 ft., Arbuckle 3,824 ft.

Graham County: C & G 1 Kuehnl, NE NE SW 34-9s-21w, elev. 2,318 ft., dry, TD 3,928 ft., anhydrite 1,790 ft., Heebner 3,518 ft., Toronto 3,541 ft., Checkerboard 3,562 ft., Arbuckle 3,903 ft.

Jones-Shelburne & Farmer 1 Lambert, SW SW NW 1-10s-21w, elev. 2,272 ft., dry, TD 3,889 ft., anhydrite 1,760 ft., Howard 3,247 ft., Topeka 3,303 ft., Lansing-Kansas City 3,555 ft., Sooy 3,839 ft.

Kantor 1 Watkins, NW NW NE 23-10s-22w, elev. 2,255 ft., dry, TD 3,929 ft., anhydrite 1,750 ft., Heebner 3,495 ft., Lansing-Kansas City 3,534 ft., Marmaton 3,826 ft., Arbuckle 3,903 ft.

Lyon County: Brack 1 Davidson, NW NE NW 33-17s-11e, elev. 1,189 ft., dry, TD 2,935 ft., Topeka 490 ft., Lansing 990 ft., Kansas City 1,250 ft., Marmaton 1,580 ft., Mississippi lime 2,162 ft., Kinderhook 2,595 ft., Viola 2,746 ft., Arbuckle 2,916 ft.

Marion County: Crest 1 Schweitzer, NE NW NW 27-19s-3e, elev. 1,321 ft., dry, TD 2,834 ft., Lansing 1,838 ft., Kansas City 2,014 ft., Mississippi lime 2,368 ft., Kinderhook 2,502 ft., Viola 2,720 ft., Simpson 2,793 ft.

Morris County: Dunne & Strait, SW NE SE 10-16s-6e, dry, TD 2,767 ft., Lansing-Kansas City 1,625 ft., Mississippi chert 2,096 ft., Kinderhook 2,146 ft., Hunton 2,336 ft., Arbuckle 2,735 ft.

Phillips County: Nadel & Gussman 1 Merklein, SW SW SW 31-3s-19w, elev. 2,080 ft., dry, TD 3,646 ft., anhydrite 1,670 ft., Heebner 3,263 ft., Lansing-Kansas City 3,302 ft., Arbuckle 3,605 ft.

Rooks County: Brooks Pierce & Kiowa 1 Nichol, NW NW SW 30-6s-20w, elev. 2,261 ft., dry, TD 3,840 ft., Toqeka 3,220 ft., Heebner 3,464 ft., Toronto 3,484 ft., Lansing-Kansas City 3,500 ft., Arbuckle 3,815 ft.

Laura Jane 1 Schneider, SW SW SW 21-7s-19w, elev 1,956 ft., dry, TD 3,467 ft., Dodge 3,139 ft., Lansing-Kansas City 3,154 ft., Arbuckle 3,417 ft.

Veeder 1 Vohs, NE NE NE 24-10s-19w, elev. 2,116 ft., dry, TD 3,734 ft., anhydrite 1,490 ft., Topeka 3,084 ft., Heebner 3,301 ft., Toronto 3,321 ft., Lansing-Kansas City 3,341 ft., Arbuckle 3,698 ft.

Russell County: Anschutz 1 Brandt, SE SE NE 2-12s-15w, elev. 1,815 ft., dry, TD 3,301 ft., Heebner 2,926 ft., Lansing-Kansas City 2,980 ft., Arbuckle 3,295 ft.

Stafford County: Vickers and Jayhawk 1 Anschutz, SE SE NE 15-21s-14w, elev. 1,925 ft., dry, TD 3,735 ft., Lansing-Kansas City 3,385 ft., Viola 3,645 ft., Simpson 3,677 ft., Arbuckle 3,724 ft.

Sumner County: Hill-Hill 1 Roy, SE SE SW 4-30s-1w, elev. 1,240 ft., dry, TD 3,893 ft., Lansing-Kansas City 2,856 ft., Mississippi lime 3,465 ft., Simpson 3,788 ft.

Johnston 1 Donley, NE SE NW 35-32s-2e, elev. 1,181 ft., dry, TD 3,564 ft., Stalnaker 2,290 ft., Kansas City 2,660 ft., Layton 2,700 ft., Mississippi lime 3,202 ft., Simpson 3,525 ft., Arbuckle 3,544 ft.

SOUTH CENTRAL NEBRASKA WILDCAT FAILURE

Furnas County: Sterling & Davis Child 1 Freas, SW SW SE 28-2n-21w, elev. 2,195 ft., dry, TD 3,758 ft., Heebner 3,269 ft., Kansas City 3,295 ft., Arbuckle 3,632 ft., granite wash 3,709 ft., granite 3,757 ft.

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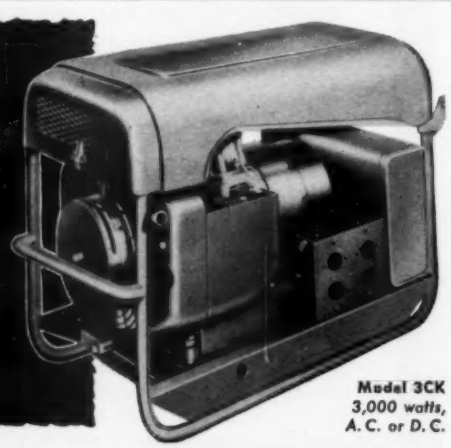

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Eastern Texas

Grayson County Continues Active

DALLAS.—Grayson County exploration has held a high place since the discovery of deep production near the town of Sandusky, located in the northwest corner of the county. Drilling reports included the following:

Mid-Continent Petroleum Corp. and Skelly Oil Co. 1 Childs, some 10 miles east of the Sandusky Oil Creek area, was drilling ahead as a new operation.

Sinclair Oil & Gas Co. had surface pipe set on its 1 R. H. Jewell, 7,900-ft. Ellenburger test 2½ miles southwest of Sandusky. Jack Grace of Wichita Falls is running a rig for Sinclair.

Three miles southeast of Sandusky, Olson Drilling Co. 1 Holder was drilling limestone at 7,796 ft., with no markers reported. Olson 1 Little, east of Sandusky in the Walker Survey, was drilling below 1,421 ft.

North of Sandusky in the Armstrong Survey, Pure Oil Co. 1 Rich was drilling below 5,930 ft.

Southeast of Sandusky in the Stickney Survey, The Texas Co. 1 Scarborough was below 7,489 ft., looking for the Ellenburger. The well has shown for flush production from the Oil Creek sand of the Ordovician.

Deep explorations have also spread to west-central Grayson. A. R. Dillard 1 W. B. McMillan, southeast of the town of Southmayd, in the Dubose Survey, was drilling shale at 6,237 ft. A light oil odor was reported from 6,199-6,210 ft. in unidentified hard sand.

EAST TEXAS (DISTRICTS 5, 6, AND 6-P) WILDCAT FAILURES

Denton County: J. M. Hickey & Sons 1 W. L. Harberson, J. Yoachum Sur., 1 mi. W Bolivar, dry, TD 2,240 ft.

Grayson County: The Texas Co. 1 Ida Winchester, C. B. Hodges Sur., ¼ mi. E Sandusky, dry, TD 9,520 ft., Ellenburger 7,565 ft.

A. R. Dillard 1 E. J. C. Cannon, James Fox Sur., 3½ mi. SE Sherman, dry, TD 4,719 ft.

Limestone County: C. W. Killough 1 R. T. Williams, P. Varela Sur., 12 mi. SW Mexia, dry, TD 2,962 ft.

Robertson County: Roland Travis 1 W. C. Anderson, Letson Purdy Sur., dry, TD 1,426 ft.

California

Kern County "Grass-Roots" Development Picking Up

LOS ANGELES.—On the extreme southeastern edge of San Joaquin Valley in Kern County, an interesting "grass-roots" development again is picking up in tempo after a short lull. The play is in Tejon Hills and Tunis Creek field, both of which are associated with the Willow Springs fault.

At Tejon Hills, discovered in July 1948, production is being obtained at around 500 ft. from the Santa Margarita sand. During 1949 some 33 producers were drilled and last year about an equal number were added, largely in the latter part of the year. Much of the recent development is on the southwest end, which has been extended about 1 mile by a single row of producers.

While the field probably will never be of major importance, its shallow depth and the fact most wells come in for about 100 bbl. of 30°-gravity crude make it very desirable drilling. Standard Oil Co. of California, Steele Petroleum Co., and Tejon Hills Co. have been the field's most active operators.

About ½ mile to the southwest of Tejon Hills production, Tunis Creek field, discovered in mid-1950, produces from both the 1,300-ft. Valvulinaria Californica sand and the 1,600-ft. Tecuya sand. Six producers have been completed in this field, more or less in a line extending about ¾ mile along the Willow Springs fault.

At Morales field's Superior pool, mid-1950 discovery in northwest Cuyama, Richfield Oil Corp. apparently has made a producer of a southern offset to the discovery well. Drilled between south and southwest offsets which missed the Miocene pay, Richfield 11-C Ritter made a good show on a test at the plugged-back depth of 5,500 ft. Except for a small pumper completed to the north, all other offsets to the discovery have been failures.

About 3 miles to the northwest, in 31-32s-20e, a similar situation existed in the Hancock area which was discovered last August. Hancock Oil Co. 33 Hancock-Bishop, a northwest offset to the 5,600-ft. discovery well, yielded some 4,800 ft. of 38°-gravity crude following a 50-minute test at 5,610-5,766 ft. A southwest offset to the pool opener and an attempted ¾-mile stepout to the northwest previously were unsuccessful.

At Guijarral Hills in Fresno County the field's northern limits probably have been moved out one location by Standard 354 "27F." Drilled to 8,510 ft., a test indicated the extensioner would make a producer. Successive stepouts by Standard in recent months have resulted in the field's limits being extended about ¾ mile to the northeast.

Among the wildcats recently started was Western Gulf Oil Co. 1 F. G. Johnson in Napa County, on the western side of Sacramento Valley above the Bay. Located in 28-8n-3w, on a 90,000-acre block, it is the company's first attempt to evaluate the huge tract. At last reports the operator has cemented 600 ft. of surface pipe.

Another recently spudded wildcat was a Signal Petroleum Co. wildcat in 31-13s-17e, Fresno County. The test, which will go to the Eocene, is on a lease block totaling some 2,000 acres. Other than the operators, companies reportedly interested were British American. Ken Oil Co. and Dunlap & Graham.

Deep producer completed.—Shell Oil Co. 315 Taylor, 28-3n-23w, Ventura Avenue area, Ventura County, flowed at the rate of 452 bbl. daily through perforations at 10,035-11,168 ft. Well was drilled to a total depth of 12,787 ft. and plugged back to 11,200 ft.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County: New pool discovery in Jeppi sand—L. O. Tarrant 1 Zuver, 18-30s-29e, pumped at the rate of 70 bbl. per day through perf. at 4,144-4,218 ft., 25° gravity, 16 per cent cut, Jeppi sand 4,153 ft., Santa Margarita 4,371 ft., plugged back to 4,226 ft., TD 4,456 ft.

CALIFORNIA WILDCAT FAILURES

Kern County: A. T. Yeager 4 Murdock, 34-27s-28e, dry, TD 1,672 ft., elev. 735 ft.

B. K. S. Oil Co. 11-A-12 Pilgrim, 12-10n-19w, dry, Santa Margarita 1,520 ft., Reserve 2,250 ft., Valv. Calif. 2,438 ft., TD 2,796 ft., elev. 1,025 ft.

San Luis Obispo County: Superior Oil Co. 14-13 Grayson-Owen, 13-31s-18e, dry, TD 4,022 ft., elev. 2,116 ft.

Ohio Fields

Clinton Sand Gas Well Highlights Quiet Week

COLUMBUS.—L. F. McGrath, et al well on the B. Bacik farm in Lot 34, Parma Township, Cuyahoga County, is the most interesting well reported in a rather dull week of drilling. The well found gas in two streaks of the Clinton sand, the first producing 618,000 cu. ft. at 3,050-3,068 ft. and the second 100,000 cu. ft. at 3,086-90 ft. The well will be tubed natural.

Clinton gas pool in Lawrence Township, Tuscarawas County, was extended ¼ mile further northwest when Morgan, et al Eugene Kinsey came in at 724,000 cu. ft. The well, located in Section 16, found the sand at 4,789-4,503 ft.

Jay Hunt, et al 4 W. H. Fulk in Section 8, Jackson Township, Muskingum County, found the Clinton sand at 3,161-65 ft., and produced 93 bbl. of oil after being shot.

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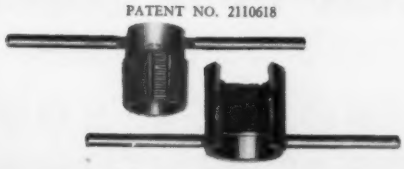

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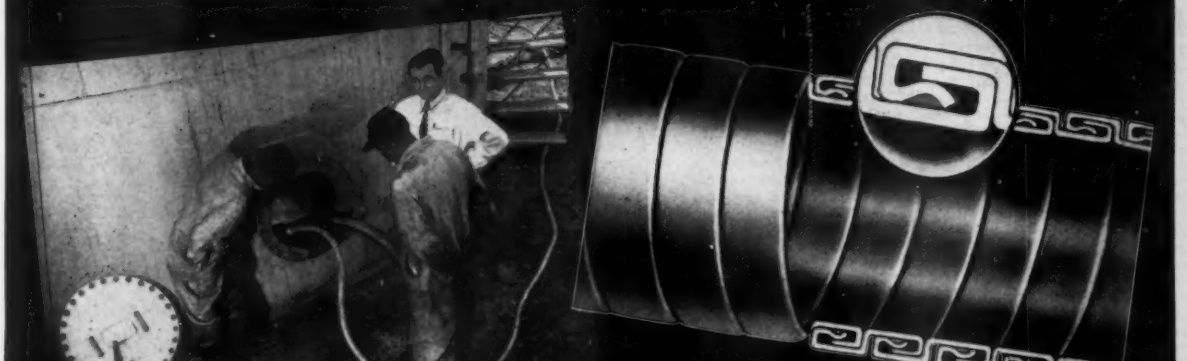

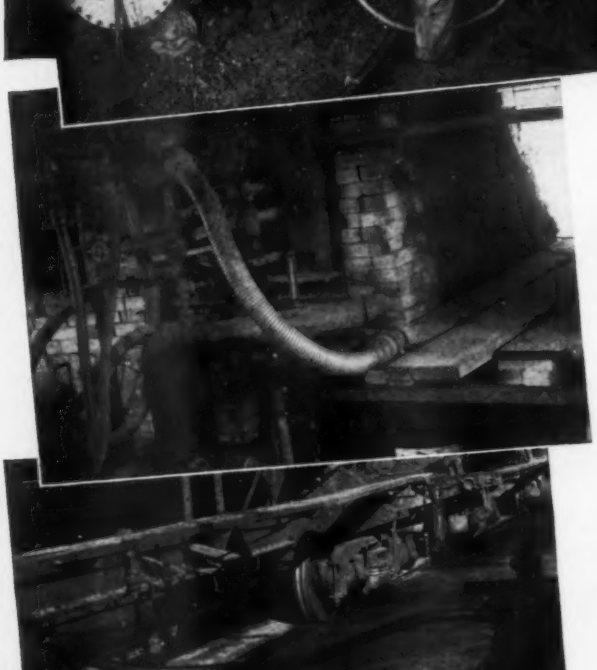

Top photo—CMH REX-TUBE Type RT-15 being used to steam out a storage tank. Middle photo—CMH REX-TUBE Type RT-15 used as a gas connection for a furnace. Bottom photo—CMH REX-TUBE Type RT-15 used for unloading a tank car.

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Permian Basin

Development Around Recent Strikes Dominates Reports

MIDLAND.—At year's end, development around recent discoveries make up the bulk of field progress reports.

South Brownfield-Canyon field of east-central Terry County was given its fourth flush producer at Honolulu Oil Corp. and Union Oil Co. of California 1 McGowan. The well marks a southeast extension and is 1½ miles south of the field's discovery well. Daily potential of 2,704 bbl. of 43°-gravity oil was based on a 6-hour flow of 450 bbl. through 1-in. opening on tubing, from open hole at 9,932-10,100 ft. Completion was without acid. Top of the reef was 9,425 ft., on an elevation of 3,252 ft.

Honolulu was rigging up for its 1 McGowan, to be one location south of the partnership's new producer.

In Salt Creek reef field of Kent County General Crude Oil Co. and Percy Jones made location for their 1-131 Young in Section 131. According to reports, the well is a wildcat as it is considered to be too far south and west to find production from the field's reservoir. Operators are expecting to hit a separate reef buildup. Proposed depth is 7,500 ft., though the reef top is thought to lie around 6,100 ft.

Last week's successful completion report on Frankel Bros. and Shell Oil Co. 1 R. S. Williams, Section 26, HE&WT Survey, northwest Schleigher County, was short-lived. Operators reentered the hole and made a recompletion higher in the penetrated section. According to field sources, production from the Wolfcamp section through perforations at 5,520-40 ft. dwindled from initial potential of a fraction under 300 bbl. daily to a very small amount of oil. The well was plugged back to 4,415 ft. and perforated in the middle Permian at 4,288-4,305 ft. (4,305-88 ft. on some reports), and was given a new completion potential of 298 bbl. daily of 34°-gravity oil, with some water, through 20/64-in. choke. Location is 2 miles south of Strawn production.

In west-central Upton County, Sinclair Oil & Gas Co. 1 McElroy Ranch Co. prepared to drill ahead below 9,411 ft. after indicating a new Pennsylvanian discovery. Location is 7 miles south of the same company's 1 Davis, recently completed Ellenburger discovery, and 11 miles south of the Pegasus multiple-pay field.

The new prospect ran a drill-stem test from 9,376-9,411 ft., with the tool open 1 hour and 26 minutes. Gas showed in 4 minutes, mud in 20 minutes and oil in 26 minutes. It was allowed to flow for 1 hour, gaging 56 bbl. of 46.3°-gravity oil. Location is in the south-central part of a block of 28 sections held in checkerboard by Wilshire Oil Co. and Standard Oil Co. of Texas, which made a deal with Sinclair to drill the well.

Cities Service Co. 1-AH University, Ellenburger gas-distillate discovery in eastern Upton County, recovered 1,100 ft. of gas and distillate-cut mud, plus 450 ft. of salty sulfur water on a test from 10,920-955 ft., in the Ellenburger. It was cored ahead to 11,015 ft. and prepared to drill-stem test again in an attempt to locate the main water table. Operators planned to attempt a water shut-off and make further tests in the Ellenburger. The well has also made a flow of oil from the Spraberry.

Humble Oil & Refining Co.'s 1 V. P. Tippett, indicated Wolfcamp strike in northeast Upton County, was running electrical surveys to 9,090 ft., total depth, still in the Wolfcamp shale. Casing will be run and the hole carried ahead to the Ellenburger.

One and one-half miles south of the Abell Silurian-Montoya field, C. H. Murphy & Co. 2 Maude Ford, which reported drilling directly from the Permian into the Simpson formation, gaged 88 bbl. of oil with no water in 1 hour while drill-stem testing the McKee section at 5,173-85 ft. The flow was through ⅝-in. bottom and ⅛-in. top chokes. If commercial production can be developed, the well will add a deeper pay horizon to the area.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Howard County: Stanolind Oil & Gas Co. 1 C. W. Burton, 27-33-2N-T&P, 11 mi. N Big Spring, TD 9,618 ft., elev. 2,630 ft., reef lime 8,866 ft., perf. 8,870-8,920 ft., flowed 217.6 bbl. 45°-gravity oil a day, 13/64-in. choke, GOR 1,635 cu. ft., TP 600 psi.

Scurry County: Amerada Petroleum Corp. 1 E. M. Houston, 4-1-J. P. Smith Sur., 4 mi. W Dunn, TD 7,845 ft., elev. 2,228 ft., Ellenburger pay 7,790-7,835 ft., swabbed 27 bbl. 43°-gravity oil a day, plus water.

Upton County: Sinclair Oil & Gas Co. 1 G. R. Davis, 20-41-5S-T&P, TD 13,363 ft., elev. 2,865 ft., Ellenburger 13,105 ft., pay 13,165 ft., flowed 174 bbl. 53°-gravity oil, 21 bbl. water in 24 hr., 12/64-in. choke, TP 225 psi., GOR 1,900 cu. ft.

Ward County: Shell Oil Co. 1 Edwards, 4-B20-PSL, 6 mi. SE Monahans, TD 8,764 ft., elev. 2,597 ft., pay 5,360-5,475 ft., pumped 17 bbl. 28°-gravity oil a day.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Coke County: Humble Oil & Refining Co. 1 Strake-Schuch, Tom Dietrich Sur. 6, 13 mi. S Robert Lee, dry, TD 6,685 ft., elev. 2,358 ft., Palo Pinto 5,334 ft., Ellenburger 6,598 ft.

Crockett County: Standard-Fryer Drilling Co. 1 P. L. Mitchell, 43-HH-GC&SF, dry, TD 8,085 ft., elev. 2,441 ft., Ellenburger 7,885 ft.

L. G. Wahlenmaier 1 Shannon, 36-UV-GC&SF, 12 mi. NW Ozone, dry, TD 1,410 ft.

Dickens County: National Associated Petroleum Co. 1 Blackwell, 5-C-C. U. Connellee Sur., dry, TD 8,387 ft., elev. 2,723 ft., Cisco 5,397 ft., Mississippian 4,674 ft., pre-Cambrian 8,280 ft.

Kent County: Bert Fields 1 Girard Trust, 44-1-H&GN, 12 mi. N Clairmont, dry, TD 7,353 ft., elev. 2,215 ft., reef 6,930 ft., Mississippian 7,320 ft.

General American Oil Co. of Texas 1 Mary Chalk, 19-1-H&GN, dry, TD 6,913 ft., elev. 2,120 ft., Strawn 6,715 ft.

General American 1-A Geo. Beggs, 61-7-H&GN, 12 mi. W Clairemont, dry, TD 7,580 ft., elev. 2,285 ft., reef 6,990 ft.

Lamb County: National Associated Petroleum Co. 2 E. Halsell, Labor 2, League 239, Cottle CSL, dry, TD 7,217 ft., elev. 3,680 ft., anhydrite 1,620 ft.

Martin County: Ashland Oil & Refining Co. 1 Lindsay, 17-38-1N-T&P, 12 mi. W Stanton, dry, TD 7,885 ft., elev. 2,788 ft., Permian 1,360 ft., Yates 2,820 ft., San Andres 4,425 ft., Spraberry 7,635 ft.

Midland County: Houston Oil Co. 1 T. A. Golladay, Sec. 3, A. P. Veazey Sur., 8 mi. E Midland, dry, TD 9,200 ft., elev. 2,688 ft., Glorietta 5,075 ft., Spraberry 7,360 ft., Dean 8,720 ft.

Mitchell County: Amerada Petroleum Corp. 1 J. F. McCabe, 3-1A-H&TC, 8 mi. NW Silver, dry, TD 7,397 ft., elev. 2,155 ft., Strawn 6,890 ft., Ellenburger 7,150 ft.

Runnels County: Blanco Co. 1 W. T. Routh, Sec. 175, ETRR Sur., 1½ mi. N Ballinger, dry, TD 4,800 ft., elev. 1,659 ft., Palo Pinto 3,298 ft., lower Cauus 3,614 ft., Ellenburger 4,330 ft.

Scurry County: T. W. Doswell & T. M. Pettigrew 1 G. E. Chorn, 59-3-H&TC, 7 mi. E Snyder, dry, TD 7,656 ft., elev. 2,446 ft., Strawn 7,450 ft., Ellenburger 7,620 ft.

Terry County: Ohio Oil Co. 1 R. H. McCormick, 87-4X-D&SE, 7 mi. NE Brownfield, dry, TD 10,440 ft., elev. 3,294 ft., Yates 2,780 ft., Grayburg 3,980 ft., San Andres 4,465 ft., Spraberry 7,100 ft.

Tom Green County: E. Sidney Hughes 1 Boys Ranch, Sec. 663, German Immigration Co. Sur., 13¾ mi. S Tankersley, dry, TD 417 ft., elev. 1,976 ft., Clark Fork 320 ft.

Ohio Oil Co. E. H. Jones "A," C. Schobel Sur. 756, 2½ mi. S Tankersley, dry, TD 5,770 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Stanolind Oil & Gas Co. 2 Leonard Oil Co., 12-26s-37e, 1 mile northeast of Dublin field, had total depth at 11,235 ft., in the Ellenburger topped at 11,160 ft., then plugged back to 9,960 ft. and set casing to 9,845 ft. Further tests were to be made in the Fusselman. Tentative top on that section was 9,270 ft.

Amerada Petroleum Corp. 2 Caudle, 3-12s-33e, deep Lea County wildcat, was drilling ahead below 10,685 ft. in limestone.

On the west side of Bagley Siluro-Devonian field, and 1¼ miles north of the area's Pennsylvanian discovery, Amerada 1 W. E. Mathers developed flowing 43°-gravity oil on a drill-stem test from 8,935-9,060 ft., gaging 33.5 bbl. of oil in 4 hours. At 9,284-9,400 ft. it flowed 73 bbl. of 59°-gravity oil in 4 hours. Recovery was distillate and 60 ft. of water on bottom. There was no flow on a test from 9,382-9,425 ft., and recovery was 1,310 ft. of 48°-gravity oil, 700 ft. of oil-cut mud estimated as 50 per cent oil, and 120 ft. of salt water. It was drilling ahead below 9,524 ft.

SOUTHEASTERN NEW MEXICO WILDCAT FAILURE

Chaves County: Dekalb Agricultural Association 1 W. P. White Co., "J," 7-10s-29e, 12 mi. NE Chisum field, dry, TD 8,735 ft., elev. 3,879 ft., San Andres 2,160 ft., Glorietta 3,390 ft., Abo 5,700 ft., Hueco 6,690 ft., Pennsylvanian sand 8,004 ft., Mississippian 8,285 ft., Devonian 8,634 ft.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURES

Childress County: Lloyd H. Smith 1 Body, NW SW 414-H-W&NW, SE corner of county, dry, TD 6,010 ft., elev. 1,672 ft., Wichita Albany 1,870 ft., Canyon 4,870 ft., reef 5,304 ft.

Briscoe County: W. J. Weaver 1 Adair estate, 50-E2-D&SE, 8 mi. N NE Silverton, dry, TD 8,950 ft., elev. 3,137 ft., Wichita Albany 3,460 ft., Canyon reef 6,300 ft., Strawn 7,250 ft., Bend 8,018 ft., Mississippian 8,280 ft., St. Genevieve 8,390 ft., St. Louis 8,480 ft., Osage 8,790 ft.

Mississippi

New Wilcox Strike Seen in Adams County

JACKSON. — A new Eocene Wilcox sand discovery was indicated for Adams County, Mississippi, this week. William Helis and Danciger B-1 George Armstrong, wildcat in Section 19-5n-2w, was originally drilled to 6,316 ft., electric log run, and sidewall samples cut. Samples carried oil showings at 3,540 ft. in the Sparta and at 6,294 ft. and 6,306 ft. in the Wilcox. On the electric log these sands were picked from 6,292-96½ ft. and from 6,304-06 ft. in the section below the Baker shale zone. A drill-stem test was then run at 6,316 ft. with packer set at 6,292 ft. Using ¼-in. chokes, top and bottom, and with a load of 475 ft. of water cushion, the tool was left open for 15 minutes. Recovery in drill-pipe was 575 ft. of 42.5°-gravity oil with no indications of salt water. Flowing bottom-hole pressure was 2,675 psi.; shut-in bottom-hole pressure was 2,800 psi.

Core was then cut from 6,316-66 ft. Recovery was oil showings in shaly sand at 6,333-35 ft. and from 6,339-40½ ft., and in very fine-grained sand from 6,364-66 ft. On last report crews were fishing for diamond-head bit after cutting another core from 6,366-95 ft. It is located approximately 1,850 ft. southwest of same interests' 2 George Armstrong, in Section 20, which had several unsuccessful completion attempts.

In Tinsley field of Yazoo County interest converged on a Smackover lime deep test. Union Producing Co. and Jones & O'Brien were drilling below 12,073 ft. at their 1 Logan, NE NE SW Section 23-10n-3w. Tinsley has produced more than 119,000,000 bbl. of oil from a series of reservoirs found from 4,500 to 6,100 ft. in the upper or Gulfian Cretaceous rocks.

Another Smackover-lime wildcat holding

interest at this time lies 17 miles southwest of the Pickens oil field and 7 miles northwest of Canton in Madison County. Continental Oil Co. 1 John R. Cameron et al, C SE SW Section 36-10n-1e, was conditioning hole to drill deeper after recovering fish. Present total depth is 10,676 ft. It is set up to test the Smackover formation or 14,500 ft. Location is on a block of 16,000 acres acquired after a seismic survey.

A third wildcat seeking the Smackover lime objective is Lion Oil Co. 1 Denkmann, SE SW NE Section 22-7n-4e, near Goshen Springs in Rankin County. It is currently fishing at total depth of 13,186 ft. in the Cotton Valley formation topped at 11,695 ft. The Hosston was previously logged at 10,988 ft. It is scheduled to be drilled to a total depth of 15,500 ft.

Michigan

Restricted Flow Rate Set For New Skeels-Dundee Pool

MOUNT PLEASANT.—Flow rate at Don Rayburn 1 Cassidy, S½ SW SE 30-20n-2w, discovery well of Skeels-Dundee pool, Gladwin County, was voluntarily restricted to 125-130 bbl. of oil a day under a tight choke arrangement. Wildcat is being produced from a Dundee dolomite pay at 3,847 ft., total depth, with the complete section, from the top, logged at 3,830 ft., to the total depth showing pay. Bottom-hole tests showed 1,493 psi. After a 50-minute flow-test there was no evidence of a drop in pressure. Well flowed 28 bbl. of oil through a small choke on this test. Tests showed no evidence of water in the oil produced.

Rayburn and Sun Oil Co., other major acreage holders in the new Skeels play, have agreed on a 10-acre drilling unit and well spacing pattern for early developmental drilling around the wildcat. Rayburn was ready to spud on the south 10-acre offset, the NE NW NE 31-20n-2w, and Sun was building road and clearing location for the diagonal southwest offset in the NE NE NW 31-20n-2w. Both of these first two follow-up tests will be drilled to the objective with rotary tools.

Commonwealth Pipe Line Co., Lakeside Refining Co. and Naph-Sol Refining Co. advanced posted prices for Michigan crude oil in all areas they serve by 12 cents a barrel effective December 16. Bay Pipe Line Corp. announced a 12-cent advance in its posted crude prices effective December 22. Other Michigan crude oil gatherers and purchasers had not advanced postings up to December 29, apparently awaiting clearance in view of the government hold-the-line request asking that all crude prices be held to the postings of December 8.

MICHIGAN SUCCESSFUL WILDCAT

Gladwin County, Sherman Township: Don Rayburn 1 Cassidy, S½ SW SE 30-20n-2w, Dundee 3,830 ft., pay 3,830-47 ft., IP: 130 bbl., pinched (estimated potential: 300 bbl. per hour), TD 3,847 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Lee Township: Ford Oil Co. 1 Goodspeed, SW SE SW 3-1n-15w, Traverse 1,227 ft., dry, TD 1,257 ft.

Bay County, Gibson Township: J. O. Mutch 1 Henderson, SE NE SE 29-18n-3e, Dundee 3,010 ft., dry, TD 3,222 ft.

Midland County, Warren Township: Turner Petroleum Corp. and Michigan Oil Co. 1 State-Bashore Comm., NE NE SW 34-16n-2w, Dundee 3,675 ft., dry, TD 3,987 ft.

Montcalm County, Montcalm Township: Charles P. Smith 1 Thompson et al, NW NW SE 9-10n-8w, Reed City zone 3,203 ft., dry, TD 3,414 ft.

Canadian Fields

D3 Zone at Duhamel Well At Least 142 Ft. Thick

CALGARY.—Socony-Vacuum Exploration Co. Duhamel 29-14 has confirmed 142 ft. of water-free D3 zone, after running drill-stem test from 4,832-40 ft. During that test the well flowed oil to the surface in 5 minutes. There was no flow rate established, as the separator froze up before a gage could be made. However, pipe recovery was 4,840 ft. of clean crude oil, no water. The Duhamel well is located in LSD 14, 29-45-12w4, 2 miles north of the company's dual zone Devonian oil discovery well, Flint 1. Well is now bottomed at 4,870 ft. and a Schlumberger log is being run. A further drill-stem test was run to determine the water line, but details of that test have not as yet been received.

The well topped D3 at 4,698 ft., and during D3-drill-stem tests the well flowed oil at rates greater than 1,700 bbl. daily. D2 Devonian zone also assured oil production and flowed oil at varying rates during drill-stem testing.

A. G. Bailey Co. of Calgary and four other groups from Calgary, Winnipeg, Montreal, and Idaho, have joined for an exploratory venture on the southern Alberta plains, about 37 miles north and northeast of Calgary and 55 miles southwest of Big Valley dual zone Devonian oil field. The new wildcat, located on farmout lands from the Hudson's Bay Oil & Gas Co., is Bailey Olds 1, in LSD 2, 18-31-27w4, located about 15 miles southeast of Olds town and 20½ miles southwest of Socony-Amerada-Gulf Wimborne 1 wildcat location. The well will be a Madison test, down to around 6,500 ft., and will spud early in January.

Albercan Oil Corp. has started drilling at another wildcat in east central Saskatchewan, its ninth exploratory venture in that province this year. In addition to the nine wildcats, one of which resulted in an oil strike, the company drilled an offset to that oil discovery, and has been carrying out development drilling on the Saskatchewan side of the Lloydminster region. Albercan has also been engaged in an exploratory program in Alberta during 1950, and currently has a wildcat under way in the Acheson-Stony Plain area.

The new Saskatchewan test is Albercan Castlewood 1, in LSD 4 12-36-16w3, about 5 miles southwest of Castlewood railpoint and 48 miles south of North Battleford. The well is making hole below 1,110 ft., and will test all horizons down to around 4,000 ft.

Canadian Delhi Oil, Ltd., has joined with Amcan Oil Corp. for an exploratory venture in the Castor area of central Alberta, about 35 miles east of Stettler oil field and 12 miles due west of the Fina-Bulwark Province 1 Viking sand oil discovery well.

The new venture is Delhi-Amcan Castor 1, LSD 3 20-38-14w4, located about 2¼ miles northwest of Bailey-Michel Castor 1 natural gas discovery well drilled in June 1949. Delhi-Amcan 1 is scheduled as a test to bottom of the Lower Cretaceous, with probable completion depth around 3,750 ft.

CANADIAN WILDCAT FAILURES

Mic Mac Coates 1, in LSD 6, 5-49-26w4, TD 5,565 ft.

National Acheson 1, in LSD 3, 28-52-26w4, TD 5,363 ft.

Canadian Delhi-H. B. Cessford 4, in LSD 6, 29-25-11w4, TD 3,445 ft.

Seaboard Desmarias 1, in LSD 4, 34-80-25w4, TD 1,474 ft.

Seaboard-Pacific-B.A.-Fortune Nestow 1, in LSD 6, 23-60-24w4, TD 3,521 ft.

Rube Goldberg Views the News for His Latest Invention

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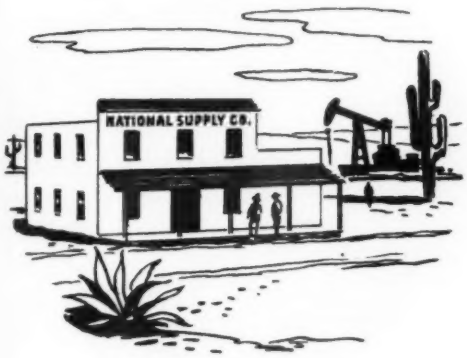

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Southwest Texas

New Gas-Distillate Pool in Bee County

CORPUS CHRISTI.—Northern Bee County drew a new Wilcox gas-distillate discovery this week 1½ miles west of the Holzmark field. The Texas Co. 1 Sallie Ragsdale, a wildcat in the A. G. Davis Survey, Abstract 155, flowed 1,173 M.c.f. of gas per day on a 10-hour gage through casing perforations at 8,474-84 ft. Distillate gravity tested 56.8°.

Jim Wells County drew a gas-distillate discovery 8 miles southeast of Alice. S. H. Howell 1 R. R. Mullen, in Tract 6, Adams Staples farm lots, cored gas sand at 5,012-18 ft. On a 4-minute drill-stem test at 5,018 ft. with packer set at 5,012 ft., using ¼-in. chokes top and bottom, it developed a flowing bottom-hole pressure of 1,900 psi. Shut-in bottom-hole pressure was 1,950 psi. in 4 minutes. After recovering 30 ft. of distillate in drill pipe, crews drilled to a total depth of 5,126 ft. and set the long string on bottom. Late in the week, preparations were being made to run gun perforator to complete as a wet-gas discovery.

Completion rig has been moved to location to test Phillips Petroleum Co. 1 Turk, wildcat discovery in State Tract 30,398 in Nueces Bay. Final tests have been delayed since the end of November 1950. Total depth is 9,644 ft.

A deep test in Eagle Hill field of Duval Co. threatened to blow out last week. Magnolia Petroleum Co. 48 Duval County Ranch Co. in J. Poitevent Survey 201, Wilcox wildcat in this shallow field, kicked below 6,283 ft. However, the gas sand was mudded off and protection string run. It is a 9,000-ft. contract.

Meanwhile, Woodward & Co. and Ralph E. Fair 1 J. R. Foster Unit 1, Wilcox wildcat in this field, was closely watched after coring gas sand and obtaining gas-cut mud in the Wilcox series. Sand with gas odor was cored at 7,455-56 ft. A 30-minute drill-stem test at 7,500 ft. with packer set at 7,456 ft. recovered 90 ft. of gas-cut mud. Shut-in bottom-hole pressure was 2,800 psi.

Three miles north of the Beeville townsite in Bee County, C. G. Glasscock and Pontiac Refining Co. of Corpus Christi have staked location for a 6,000-ft. wildcat. It is their 1 Mrs. Edith Scott et al on a 754-acre tract in the T. Herencia Survey, Abstract 182. It is located 3,500 ft. northeast of their 1 Sudie Scott, a recently-finaled gas discovery. On open-flow test it tested 2,800 M.c.f. per day through casing perforations at 3,272-78 ft. Total depth was 4,600 ft. with 5½-in. pipe set at 3,400 ft.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCAT

Jim Hogg County: New pay at Ed Lasater—Gorman & DeLange, et al, 20 Mary M. Lasater Estate, William Key Sur., 25 mi. SW of Hebbronville, TD 2,451 ft., perf. 2,441-46 ft., IP: 88 bbl. oil per day on pump.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Duval County: Bridwell Oil Co. 1 Juan Canales, San Pedro Charco Redondo Grant, A-475, 12 mi. S of Benavides, dry, TD 6,506 ft.

John F. Camp 1 E. J. Miller, Santos Garcia Grant, A-1,985, 5 mi. NW of Realitos, dry, TD 4,603 ft.

Holly Development Co. and Barbara Oil Co. 26 Driscoll Estate, "Santa Rosali" Rafael Ramirez Grant, A-476, dry, TD 2,701 ft.

Glenn G. Mortimer, Jr., 1 J. M. Bennett, SK&K Sur. 431, 5 mi. W SW of Conoco Driscoll field, dry, TD 4,005 ft.

Frio County: Humble Oil & Refining Co. 1 McKinney, Henry Castro Sur. 61, A-257, dry, TD 5,417 ft.

Hidalgo County: Rycade Oil Corp., et al, 1 Showers Estate, Porcion 80, 14 mi. NW of Mission, dry, TD 7,510 ft.

San Patricio County: Kirkwood & Co., et al, 1 Margaret Eads Miller, Malcolm McAuley Sur., A-13, 3 mi. SW of Sinton, dry, TD 8,015 ft.

Webb County: Killam & Hurd, Inc., and Blanco Oil Co. 1 A. Lopez, Sur. 110, 17 mi. N of Bruni, dry, TD 2,942 ft.

Wilson County: Deep Rock Oil Co., et al, 1 N. A. Poth, Don Gasper Flores Grant, A-13, dry, TD 6,200 ft.

Zapata County: Charles E. Long 1 N. Smith, et al, El Javali Grant, 13 mi. W of Guerra, dry, TD 1,999 ft.

Rocky Mountain

New Logan County, Colorado Field Appears Outstanding

DENVER.—British-American Oil Producing Co., wholly-owned United States producing subsidiary of the British-American Oil Co., Ltd., which recently completed its 1 Koenig & Ashby well in Logan County, Colorado, has now completed two additional oil wells in the same general area. Present indications are that this discovery is one of the most important, if not the most important, high-gravity fields in northeastern Colorado.

British-American 1 Yenter well on an 8-hour test before being shut in for tank room flowed 402 bbl. of oil, a flowing rate of 1,206 bbl. per day. The British-American 1 Ramey well before being shut in for tank room swabbed 275 bbl. of oil in 12 hours.

British-American owns a large block of leases surrounding its Koenig & Ashby, Yenter and Ramey wells. The company is now drilling two additional wells in the area and plans to commence additional wells shortly after the first of the year. The crude from these wells is sweet crude of approximately 40°-gravity and is being produced at approximately 150 bbl. per day under proration.

Interest has been revived in the area along the northeast side of the Salt basin of southwestern Colorado this week with shows of gas in the Continental Oil Co. 1 Unit, C W½ NE SW 18-47n-14w, Nucla Unit, Montrose County. The operator picked tentative top of Paradox at 5,109 ft., where the well went out of granite wash, and shales with streaks of lime were reported below that depth. On a drill-stem test in the top of the section the well reportedly made a small amount of gas, reported as noncommercial. Two additional tests were made between 5,250-5,470 ft., present total depth, but these have failed and the operator is preparing to drill ahead. This well has been in granite wash almost from the surface, and the operator planned to abandon at around 5,500 ft. if no sediments were found by that depth. This wildcat is of considerable importance for future drilling along the lengthy Uncompaghre fault forming the northeast boundary of the Salt basin. A number of operators have lease holdings through the area, and Pure Oil Co. and others are reported considering additional wildcat drilling in the area.

In northwestern Colorado Continental Oil Co. apparently has a new pay discovery in the Weber sand at the first deep well in Thornburg field. The well is 1 Lewin, SE NE SE 17-3n-91w, Moffat County. Weber was topped at 4,005 ft. On drill-stem test 4,004-82 ft. the well made 1,500,000 cu. ft. of gas daily, and subsequent tests to 4,227 ft., still in the Weber sand, have shown volumes of as much as 2,000,000 cu. ft. The operator will drill through the Weber, and possibly to Madison, before running casing for addition tests of the Weber zone. This field has produced gas from Dakota since discovery in 1925 but there has been no previous deep test on the structure.

Recent completions in the Clareton area, Weston County, Wyoming, have been of interest, and a drill-stem test by Morton Oil Co. at 1 Van Herwynen, C SW SE 9-43n-65w, indicated a ½-mile northeast extension to the field. This well topped Newcastle at 6,006 ft. and on drill-stem test 6,006-46 ft. the well made 4,040 ft. of oil in 40 minutes. Casing has been cemented on top of the sand for completion of the well. Discovery in this field was made during the past summer and there are now five producing wells, extending over a 2½-mile area on a northeast-southwest line. The field is southwest of the Mush Creek-Skull Creek pools, where there has been considerable development drilling to the Newcastle producing sand for the past 2 years. Active drilling is expected in the Clareton area as a result of this, and other recent completions.

WYOMING WILDCAT FAILURE

Northwest Arvada, Sheridan County: American Liberty Oil Co. 1 Stanolind-Govt., SW SW SW 34-57n-80w, TD 9,813 ft., dry, Muddy 9,380 ft., Dakota 9,435 ft., Morrison 9,753 ft.

COLORADO WILDCAT FAILURE

McElmo, Montezuma County: Byrd-Frost et al 3 Schmidt, C SW NW 12-36n-18w, TD 2,593 ft., dry, Kayenta 1,090 ft., Wingate 1,140 ft., Chinle 1,960 ft., Shinarump 2,580 ft.

Louisiana-Arkansas

Deep Test Scheduled For Columbia County

SHREVEPORT.—A 10,500-ft. wildcat location has been staked by Arkansas Fuel Oil Co. in Section 1-19s-23w, Columbia County, Arkansas. The well will be the 1 Clotilde Glass estate, and will explore the Smackover. Location is less than a mile northeast of Taylor.

In the same county, Gulf Refining Co. has made location for another Smackover test, scheduled to go to 8,000 ft. Located in Section 9-17s-20w, the company's 1 A. L. Pittman is approximately 1¾ miles northwest of Magnolia field. It is spotted on a 1,000-acre farmout from Chicago Corp. which is supporting the venture.

In Union County, Roberts Petroleum Co. will soon know the outcome of the confirmation well of its recent discovery. Offsetting the 1 Lena (previous strike) to the north, the 1 Ramsey is testing perforations at 2,900-04 ft. Total depth is 2,908 ft. The company's east offset, 2 Lena, is located in Section 25-17s-14w, and is drilling at 2,600 ft. The suggested name for the new area is "Lawson."

North Louisiana.—R. A. Campbell is preparing to test his 1 Learned-Metcalf, wildcat in 1-4n-8e, Concordia Parish. Total depth of the exploratory well is 7,515 ft., with 5-in. casing set to 5,689 ft. Shows were encountered in the Wilcox at 5,318 ft., 5,630 ft., and 7,163 ft.

In Concordia Parish, the new Fairview pool got its first dry hole at Sinclair Oil & Gas Co.'s 2 R. B. Sharp, 11-4n-9e, but Sinclair has an apparent confirmation for the field at the 3 Sharp, 10-4n-9e. Carter Oil Co. has two operations in the field: 1 State of Louisiana, 10-4n-9e, and 1 James, north offset to the 1 Sharp.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Tensas Parish: D. M. Lide 1 Mrs. H. L. Jacoby, 1-12n-12e, TD 8,820 ft., perf. Tuscaloosa 8,806-16 ft., flowed 204 bbl. 54°-gravity distillate per day, 10/64-in. choke, TD 2,500 psi., GOR 3676.

NORTH LOUISIANA WILDCAT FAILURE

Bienville Parish: Nebo Oil Co. 1 Colbert, 15-16n-7w, dry, TD 8,257 ft., no tops reported.

Concordia Parish: Barnett Serio 1 Frank Junkin, 52-5n-9e, dry, TD 7,008 ft., Cook Mountain 2,970 ft., Sparta 3,253 ft., Cane River 3,997 ft., Wilcox 4,470 ft.

LaSalle Parish: Carter Oil Co. 1 Delta-Ten-

sas, 6-5n-4e, dry, TD 5,506 ft., elev. 54 ft., no tops reported.

ARKANSAS WILDCAT FAILURES

Lafayette County: A. M. Shirey, Jr., 1 W. R. Sheffield, 12-16s-24w, dry, TD 4,631 ft., elev. 268 ft., Nacatoch 1,739 ft., Saratoga 2,030 ft., Tokio 2,640 ft., Paluxy 3,130 ft., massive anhydrite 4,319 ft.

Union County: Burnett Drilling 1 Shaw Leake, 14-16s-18w, dry, TD 6,869 ft., no tops reported.

Illinois-Ind.-Ky.

Four Zones Show Oil In Wayne County Wildcat

DISCOVERY of another producing area appears to have been made in northeastern Wayne County, Illinois, where John Zanetis has run casing to test his 1 Daubs, NE NE NE 31-1n-9e. The well, located 7 miles northeast of Fairchild and about a mile east of production in the Clay City-Noble Consolidated pool, has indicated production in four zones, the Aux Vases, O'Hara, Rosiclare, and McClosky. Casing is cemented on bottom at 3,306 ft.

A 60-minute drill-stem in the Aux Vases zone at 3,165-81 ft. got a substantial showing of gas and yielded 60 ft. of clean oil in the breakdown. A test of the same duration at 3,200-3,306 ft., taking in the three lower zones, got gas in 17 minutes and flowed clean oil after 53 minutes.

Another Wayne County wildcat, Floyd & Henson and Aurora Gasoline Co. 1-A Bunting, SW NE NW 35-1s-7e, also seems assured of making a well in two zones, the O'Hara and McClosky. In preliminary tests of the McClosky, the well swabbed 1½ bbl. of oil per hour natural, and 3 bbl. per hour after acidizing with 2,000 gal. McClosky saturation was logged at 3,270-75 ft. Total depth is 3,276 ft. with casing on top that zone at 3,265 ft. O'Hara now is being tested with casing opened opposite a saturated interval at 3,196-3,208 ft.

Gulf Refining Co. 1 Warnecke, NE NE NW 6-2n-3w, a prospective McClosky lime discovery well in the area 6 miles northwest of Carlyle, Clinton County, Illinois, has been deepened to the Devonian, in which strong gas showings have been found. A drill-stem test was attempted in this zone at 2,170-2,217 ft. but the tool was closed after 9 minutes because of the indicated heavy gas flow which showed within 1 minute. At latest report, hole was being cored ahead. In a previously reported drill-stem test of McClosky lime at 1,194-1,211 ft., the well got a good flow of clean oil. The area is 1½ miles northeast of the Frogtown pool and more than 3 miles from the Carlyle pool, both of which produce from the Cypress sand.

ILLINOIS SUCCESSFUL WILDCAT

Jefferson County: Bell Brothers 1 King, SE SE NW 13-2s-4e, IP 18 bbl., McClosky 3,052-76 ft., TD 3,115 ft. (extends Northwest Markham City pool).

ILLINOIS WILDCAT FAILURES

Macoupin County: Clark C. Nye 1 Senaldi, SW NE SE 34-7n-6w, dry, TD 1,747 ft.

Richland County: Calvert Drilling Co. 1 Bennett, NE NW NW 15-2n-10e, dry, TD 3,302 ft.

Wayne County: Ward W. Dayton 1 Hale, N½ NE NW 23-1n-6e, dry, TD 3,259 ft.

White County: Nash Redwine 1 Merritt, SE SE NE 5-7s-9e, dry, TD 3,190 ft.

INDIANA SUCCESSFUL WILDCATS

Posey County: V. R. Gallagher 1 Toran, SE SE SE 16-6s-14w, IP 440 bbl., Waltersburg 2,122-33 ft., TD 2,345 ft. (extends Welborn pool).

Ryan Oil Co. 1 Buchanan, NE NE NW 22-6s-13w, IP 114 bbl., Aux Vases 2,766-72 ft., TD 2,930 ft. (opens new pool).

Vanderburgh County: Barron Kidd 1 Martin, NW SW NW 5-5s-11w, IP 15 bbl., Cypress 2,224-38 ft., TD 2,550 ft. (opens new pool).

INDIANA WILDCAT FAILURES

Gibson County: C. E. O'Neal 1 Yager, SW NW SE 30-3s-11w, dry, TD 2,606 ft.

Posey County: Ashland Oil & Refining Co. 1 Brass, SW NW NW 17-7s-12w, dry, TD 2,802 ft.

Sullivan County: Carter Oil Co. 1 Halberstadt, SW SW SE 10-9n-10w, dry, TD 1,551 ft.

Circle Drilling Co. 1 Cox, 19-7n-9w, dry, TD 1,411 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Webster County: Ryan Oil Co. 1 Stinnett, SE NE NW 25-M-32, IP 51 bbl., O'Hara 3,109-13 ft., TD 3,215 ft.

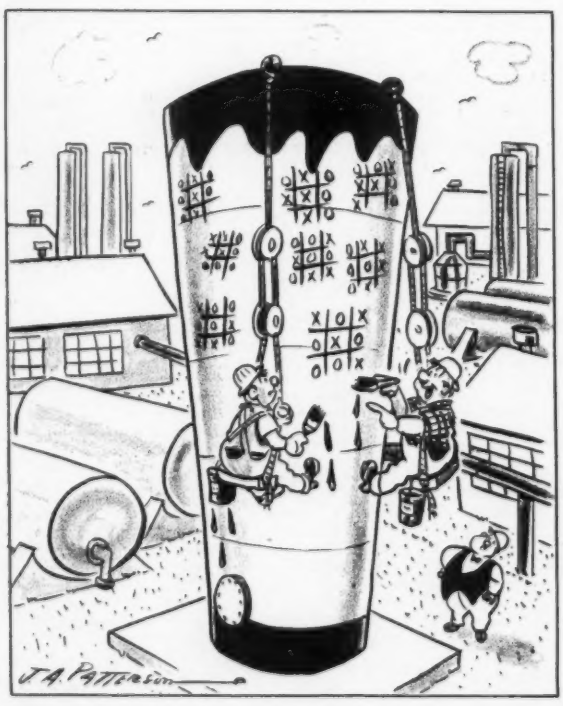
WESTERN KENTUCKY WILDCAT FAILURES

Henderson County: Frank B. Murta 1 Wilson, 20-P-22, dry, TD 2,742 ft.

National Associated Petroleum Co. 2 Hicks, C SE SW 11-Q-25, dry, TD 2,251 ft.

EASTERN KENTUCKY

ASHLAND.—At year's end wildcat drilling in eastern Kentucky is at a minimum. Cold and snow combined with lack of attractive wildcat drilling sites has held down exploratory ventures. Big Sandy gas field continues as the most active pool in development work. Recent completions in this large field are: Kentucky West Virginia Gas Co. 956 Johnny Wireman, Magoffin County sector, 1,639,000 cu. ft. of gas daily from Maxon (Mississippian) sand at a total depth of 1,276 ft.; same company 5968 Wilburn Newsom in Pike County sector, 539,000 cu. ft. of gas daily from Devonian black shale at total depth of 3,636 ft.



THE OIL AND GAS JOURNAL

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FTC Denial

Ban on discounts is not sought, attorneys declare

WASHINGTON.—Federal Trade Commission attorneys have denied that they are making any effort to prohibit the granting of functional discounts as charged by spark plug manufacturers whose pricing practices are under attack.

Their denial came as the commission opened argument on an order which would prohibit manufacturers from granting automobile manufacturers lower prices on plugs to be used in new cars than on plugs for resale to automobile distributors. *(The Oil and Gas Journal, October 26, 1950, page 56.)*

Respondents in the case alleged that the proposed order was so written as to break down the present functional classification of industry and require manufacturers to sell their product at the same price to all buyers, whether they be other manufacturers, wholesalers, retailers, or consumers, but FTC counsel denied that this was either the purpose or effect of the order.

However, it was asserted, the commission does aim at terminating what it terms "illegal discrimination" in prices among the customers of the spark plug manufacturers who are in competition with each other, among the instances cited being a 10 per cent discount alleged to have been given "several" major oil companies which was not also available to independent parts wholesalers.

Other cases.—The importance of the case from the standpoint of the oil and other industries not directly involved lies in the fact that the FTC has indicated that if successful in this prosecution it will undertake similar cases against so-called functional pricing of other products. A Dun & Bradstreet survey developed that virtually all manufacturing industries buy or sell raw materials, supplies, or components from other industries.

The commission's position was made clear as it prepared to hear argument, in response to inquiries from several groups which would be affected by the order if it broke down the functional pricing system, including the National Congress of Petroleum Retailers, Detroit.

In letters to those groups, Joseph E. Sheehy, director of the FTC bureau of antimonopoly, gave assurance that the commission is not moving to outlaw wholesaler functional discounts and expressed the opinion the Robinson-Patman Act does not provide for such action.

"These cases do not involve (1) any attempt to prohibit the granting of functional discounts as such; (2) any attempt to eliminate wholesalers from the distribution picture; or (3) any attempt to drive independent dealers out of the spark plug business or any other business in which they may desire to engage," Sheehy declared.

Intentions clarified.—"No reasonable interpretation of the position taken by this bureau or by the attorneys supporting the complaints in these cases permits the conclusion that the commission is being urged to prohibit sales being made to wholesalers at prices lower than prices made to retailers. That proposition has not been urged. In the briefs which we have filed with the commission, we have stated that it is not our intention to urge such a proposition.

"The principal purpose of these cases is to terminate illegal discriminations in price among the customers of spark plug manufacturers who are in competition with each other. The record, which of course has been made under oath, shows that the buyers who have been granted the discriminatory discounts have used them in such a manner as to cause serious injury to competition, which might otherwise have been furnished by independent wholesalers and, in turn, by independent retailers."

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Manufacturer's Agent - Oil Well and Refinery Supplies

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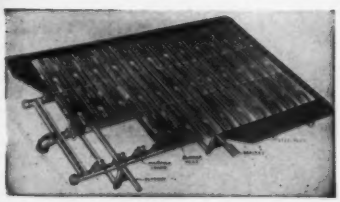

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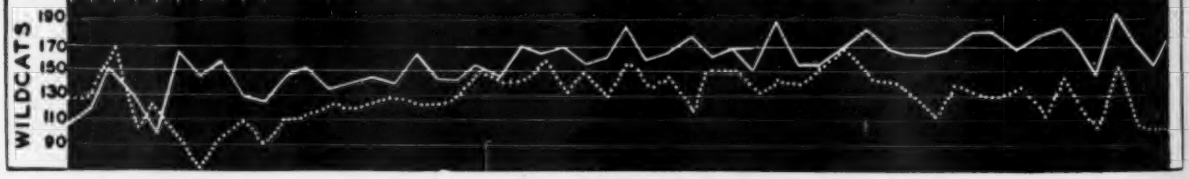
CURRENT STATISTICS

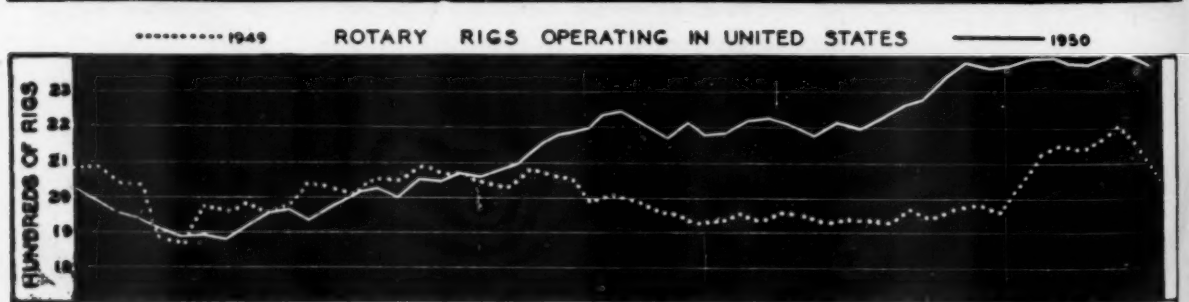
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED DECEMBER 30, 1950

	Total of all wells					Dec. 30		Wildcat completions and discoveries					Cumulative total, 1950				
	Comp.	Oil	Gas	Dry	Footage	1950	1949	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	7	4	0	*3	10,192	649	940	0	0	0	0	0	0	0	0	0	0
Pennsylvania	19	4	5	†10	28,671	1,294	1,651	0	0	0	0	0	0	0	1	3	4
West Virginia	19	1	15	3	63,404	653	525	0	0	0	0	0	0	0	24	20	44
Ohio	17	4	7	6	30,751	1,027	1,107	0	0	0	0	0	2	0	2	15	19
Indiana	19	9	0	10	37,134	1,586	1,329	3	0	0	4	7	57	0	2	250	309
Kentucky	19	10	3	6	45,644	1,173	1,042	1	0	0	2	3	30	0	1	103	134
Illinois	33	18	0	15	83,334	2,844	2,692	1	0	0	4	5	56	0	5	605	666
Michigan	12	3	0	9	32,917	885	993	1	0	0	4	5	34	0	6	306	346
Kansas	83	45	4	34	264,704	3,945	3,371	6	0	0	20	26	120	0	13	671	804
Nebraska	3	1	0	2	9,573	160	41	0	0	0	1	1	8	0	4	63	75
Oklahoma	119	72	6	‡41	452,930	5,482	4,388	0	0	1	11	12	154	6	22	656	838
Texas	346	207	14	125	1,480,455	16,588	13,756	13	1	3	75	92	523	48	110	2,746	3,427
North Central (Dist. 7-B & 9)	136	69	5	§62	378,189	5,062	4,497	8	0	3	33	44	230	2	33	1,071	1,336
West (Dist. 7-C & 8)	91	67	0	24	511,826	5,002	3,308	3	1	0	16	20	104	4	6	553	667
Panhandle (Dist. 10)	11	5	3	3	46,602	889	945	0	0	0	2	2	1	0	2	21	24
Eastern (Dist. 5, 6, & 6-P)	21	13	0	8	88,314	1,164	1,125	0	0	0	5	5	16	6	3	198	223
Gulf Coast (Dist. 2 & 3)	52	30	6	16	298,266	2,330	1,997	1	0	0	9	10	86	23	41	417	567
Southwest (Dist. 1 & 4)	35	23	0	12	157,258	2,141	1,884	1	0	0	10	11	86	13	25	486	610
Louisiana	45	27	2	16	297,171	2,452	2,402	3	0	0	7	10	51	16	6	230	303
Northern	22	12	1	9	109,734	1,324	1,461	1	0	0	3	4	15	3	2	117	137
Southern	23	15	1	7	187,437	1,128	941	2	0	0	4	6	36	13	4	113	166
Arkansas	10	5	0	5	36,150	407	325	0	0	0	2	2	10	0	0	90	100
Mississippi	0	0	0	0	0	298	335	0	0	0	0	0	11	2	0	113	126
Southeastern States	0	0	0	0	0	58	48	0	0	0	0	0	1	0	1	30	32
Montana	3	2	1	0	9,183	269	253	0	0	0	0	0	3	0	0	46	49
Wyoming	9	7	0	2	41,629	607	599	0	0	0	1	1	23	0	2	99	124
Colorado-Utah	2	1	0	1	9,179	116	137	0	0	0	1	1	7	0	4	66	77
New Mexico	6	2	3	1	34,575	607	506	0	0	0	1	1	15	1	4	57	77
California	43	36	0	7	168,106	1,846	2,537	1	0	0	6	7	33	0	4	389	426
Miscellaneous	0	0	0	0	0	53	61	0	0	0	0	0	0	0	0	28	28
Total United States	814	458	60	296	3,135,702	42,999	39,038	29	1	4	139	173	1,138	73	211	6,586	8,008
Total previous week	847	498	59	290	3,280,011	....	....	21	1	2	128	152	1,109	72	207	6,447	7,835
Total December 30, 1949	725	417	60	248	2,651,665	....	....	16	1	3	87	107	932	84	191	5,598	6,805

Service wells included: *3, †8, ‡1, §5.





DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 30 crude oil	B. of M. Dec. demand	Dec. 23 crude oil
Alabama	3,050	2,400	2,650
Arkansas	81,850	88,000	81,800
California	962,700	955,000	964,100
Colorado	78,400	67,000	77,800
Eastern	59,850	67,000	52,600
Florida	1,375	1,600	1,575
Illinois	168,200	180,000	170,100
Indiana	30,900	31,000	30,300
Kansas	323,200	306,000	319,300
Kentucky	30,900	31,000	30,900
Louisiana	592,650	610,000	592,500
North Louisiana	116,700	.....	116,550
South Louisiana	475,950	.....	475,950
Michigan	42,200	47,000	39,700
Mississippi	100,750	112,000	99,750
Montana	22,200	24,000	22,300
Nebraska	7,550	6,000	5,500
New Mexico	130,800	142,000	130,800
Oklahoma	495,850	468,000	497,300
Texas	2,375,425	2,380,000	2,375,425
Dist. 1 (Southwest)	31,000	.....	31,000
Dist. 2 (Southwest)	141,350	.....	141,350
Dist. 4 (Southwest)	218,375	.....	218,375
Dist. 3 (Gulf Coast)	425,700	.....	425,700
Dist. 5 (Eastern)	40,075	.....	40,075
Dist. 6 (Eastern)	92,150	.....	92,150
East Texas field	269,700	.....	269,700
Dist. 7-C (West)	71,825	.....	71,825
Dist. 8 (West)	773,400	.....	773,400
Dist. 7-B (W. Central)	72,650	.....	72,650
Dist. 9 (N. Central)	149,200	.....	149,200
Dist. 10 (Panhandle)	90,000	.....	90,000
Utah	3,900	4,000	3,800
Wyoming	181,800	188,000	182,900
Total United States	*5,693,550	5,710,000	5,681,100
Change from previous week, up 12,450			
Canada			82,730

Total U.S. production January 1-December 23 †1,976,084,215 bbl.
Same period last year (crude plus cond.) 1,847,128,955 bbl.

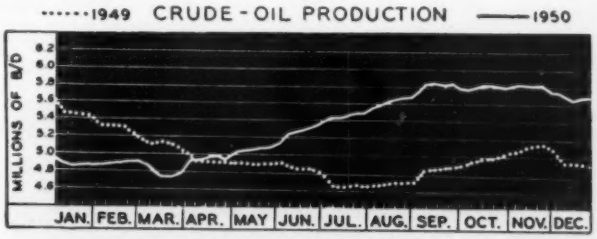
*Not including 102,535 bbl. condensate. †Including 35,682,010 bbl. condensate.

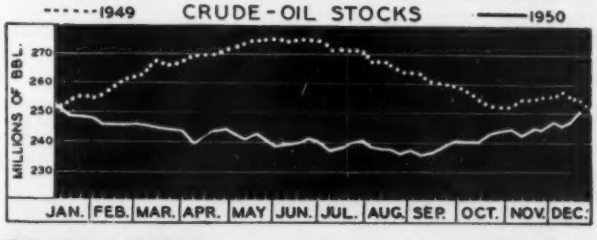
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

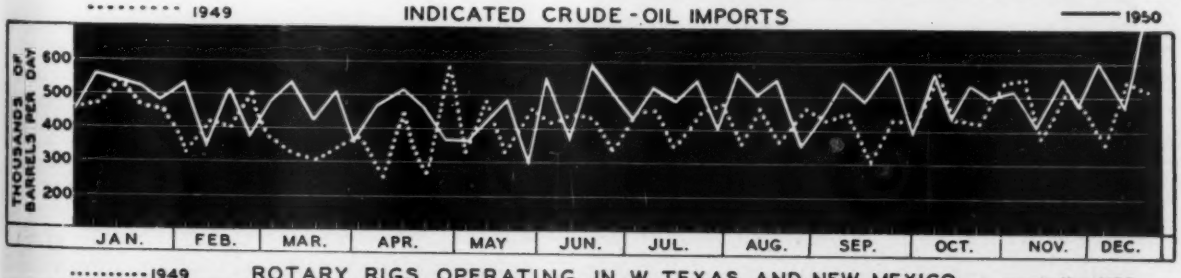
(Thousands of barrels)

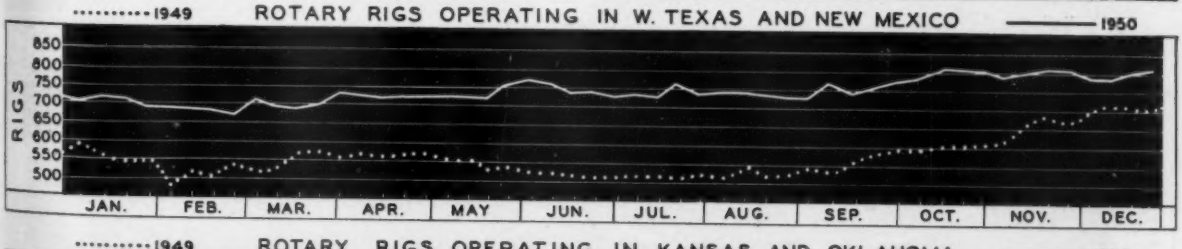
	Dec. 23, 1950	Dec. 16, 1950	Dec. 24, 1949
Pennsylvania Grade	2,186	2,170	2,831
Other Appalachian	1,451	1,267	1,908
Illinois, Indiana, Michigan	9,811	10,025	12,191
Arkansas	2,474	2,607	2,958
Louisiana	14,488	14,432	14,115
North	2,653	2,663	3,467
Gulf	11,835	11,769	10,648
Mississippi	2,564	2,477	2,149
New Mexico	7,158	7,111	7,471
Oklahoma and Kansas	39,001	38,368	38,147
Texas	120,878	119,809	116,572
East Texas	14,753	14,228	15,703
West Texas	47,392	46,428	43,623
Texas Gulf	28,574	29,128	30,687
Other Texas	30,159	30,025	26,559
Rocky Mountain	11,541	11,351	13,583
California	31,000	30,648	37,566
Foreign	8,247	7,009	7,339
Total	250,799	247,274	256,830

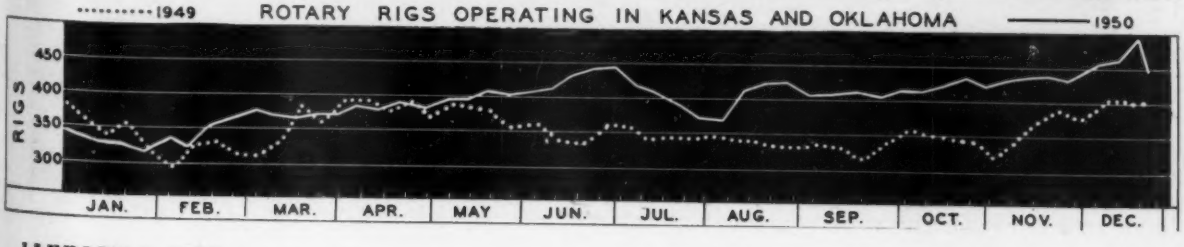
*Bureau of Mines.









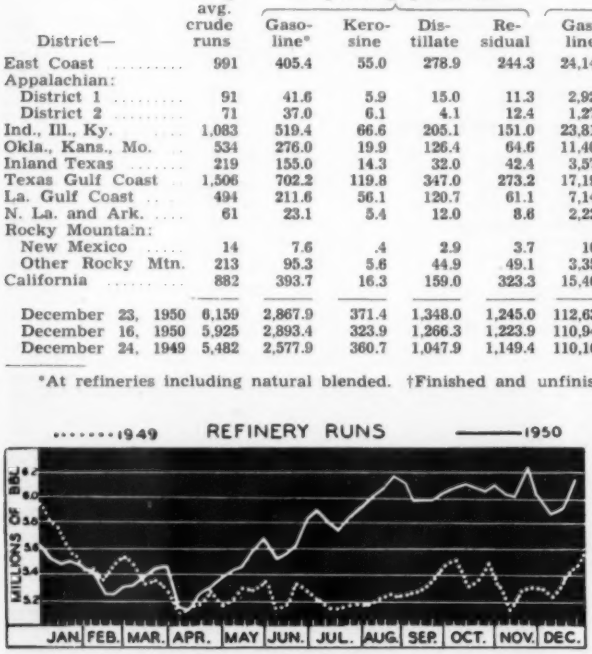


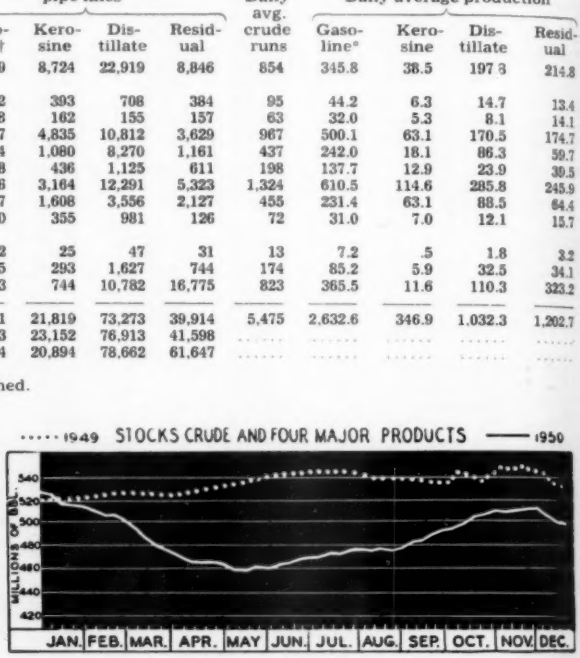
A.P.I. REFINERY REPORT, DECEMBER 23

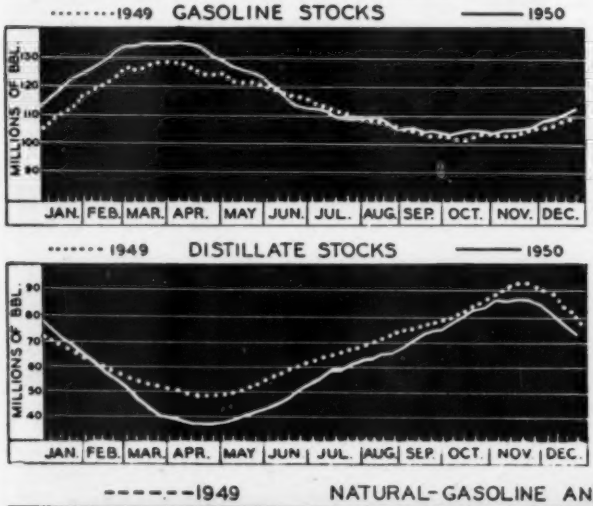
(Thousands of barrels)

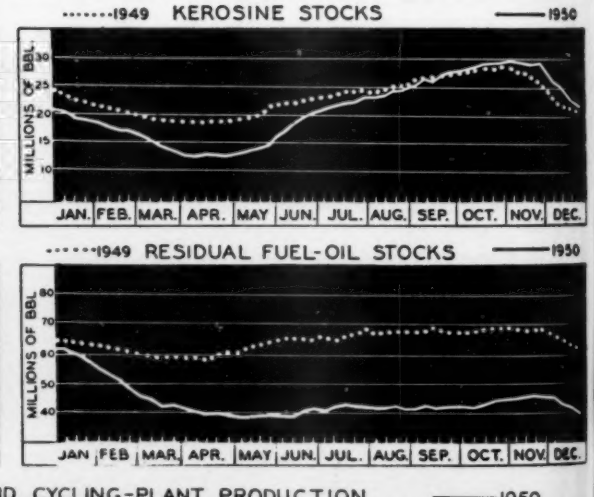
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, December 1949				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	991	405.4	55.0	278.9	244.3	24,149	8,724	22,919	8,846	854	345.8	38.5	197 8	214.8
Appalachian:														
District 1	91	41.6	5.9	15.0	11.3	2,922	393	708	384	95	44.2	6.3	14.7	13.4
District 2	71	37.0	6.1	4.1	12.4	1,278	162	155	157	63	32.0	5.3	8.1	14.1
Ind., Ill., Ky.	1,083	519.4	66.6	205.1	151.0	23,817	4,835	10,812	3,629	967	500.1	63.1	170.5	174.7
Okla., Kans., Mo.	534	276.0	19.9	126.4	64.6	11,404	1,080	8,270	1,161	437	242.0	18.1	86.3	59.7
Inland Texas	219	155.0	14.3	32.0	42.4	3,578	436	1,125	611	198	137.7	12.9	23.9	30.5
Texas Gulf Coast	1,506	702.2	119.8	347.0	273.2	17,196	3,164	12,291	5,323	1,324	610.5	114.6	285.8	245.9
La. Gulf Coast	494	211.6	56.1	120.7	61.1	7,147	1,608	3,556	2,127	455	231.4	63.1	88.5	64.4
N. La. and Ark.	61	23.1	5.4	12.0	8.6	2,220	355	981	126	72	31.0	7.0	12.1	15.7
Rocky Mountain:														
New Mexico	14	7.6	.4	2.9	3.7	102	25	47	31	13	7.2	.5	1.8	3.2
Other Rocky Mtn.	213	95.3	5.6	44.9	49.1	3,355	293	1,627	744	174	85.2	5.9	32.5	34.1
California	882	393.7	16.3	159.0	323.3	15,463	744	10,782	16,775	823	365.5	11.6	110.3	323.2
December 23, 1950	6,159	2,867.9	371.4	1,348.0	1,245.0	112,631	21,819	73,273	39,914	5,475	2,632.6	346.9	1,032.3	1,202.7
December 16, 1950	5,925	2,893.4	323.9	1,266.3	1,223.9	110,943	23,152	76,913	41,598	.....	.....	.....	.....	.....
December 24, 1949	5,482	2,577.9	360.7	1,047.9	1,149.4	110,164	20,894	78,662	61,647	.....	.....	.....	.....	.....

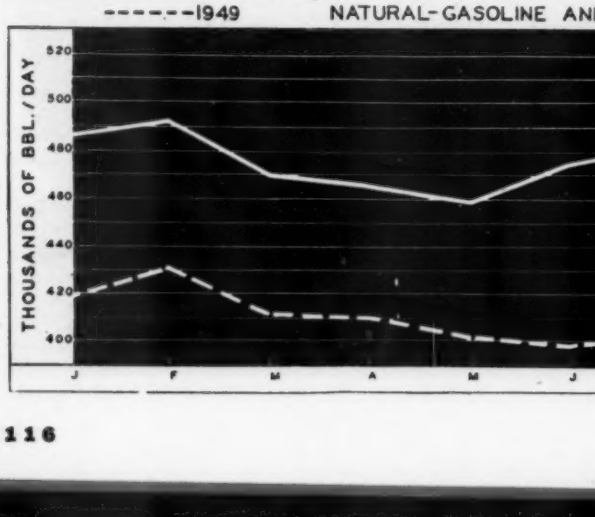
*At refineries including natural blended. †Finished and unfinished.

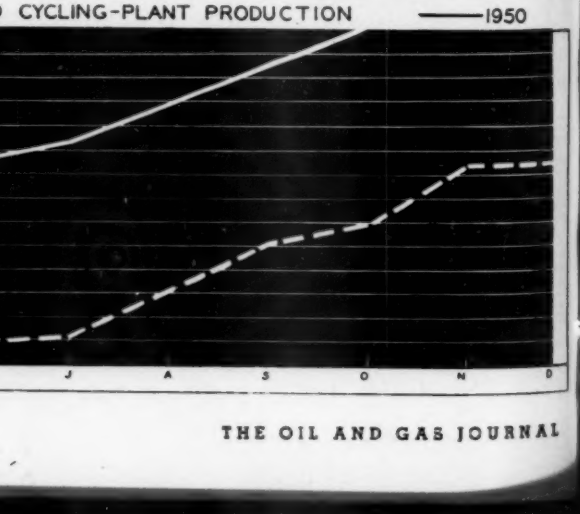












CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.	
East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

COLD weather and snow in some of the important areas affecting fuel-oil demand resulted in tight fuel markets. Total burning-oil stocks decreased 6,600,000 bbl. for the week ended December 23. Stock reductions for these products in the 4-week period ended December 23 amounted to more than 25,000,000 bbl.

In the Mid-Continent area, shipping orders are backing up more because of a shortage of tank cars than a lack of products at refineries. A shortage of coiled cars for residual fuel started early in December and has become more severe in recent weeks. Demand for heavy fuel has been affected more by the cold weather than would be expected from an increase in use of residual for heating. Many public-utility plants and other industrial users along the northern border of the Mid-Continent area have been using natural gas as a principal source of power. Increased demands for natural gas for home heating in this area and in the northern states have cut the supply of gas available for utility and industrial use. These plants shifted part of the load to residual fuel, and since they had very little heavy fuel in storage, daily receipts must approximate consumption.

At the present, the shortage is in cars needed to move the material, but if the depletion of refinery stocks continues, the shortage will become one of supply. There is little incentive to produce more residual from a barrel of crude at the market prices now posted. Buyers are reported bidding well above these prices for material.

Cars for shipment of distillate fuels are now scarce, and Mid-Continent suppliers are reporting heavy backlogs of shipping instructions for No. 1 and No. 2 fuels. Above-the-market bids are reported.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotation of leading suppliers as of January 2, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅛-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11¼-11½	13.5-13.75	11½-12
42-44 w.w. kerosine	9¼-9⅜	10-10.1	8¾-9
No. 2 straw fuel oil	8⅜-8⅝	9-9.25	7¾-8
No. 6 residual	$1.80-1.90	$2.25-2.30	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

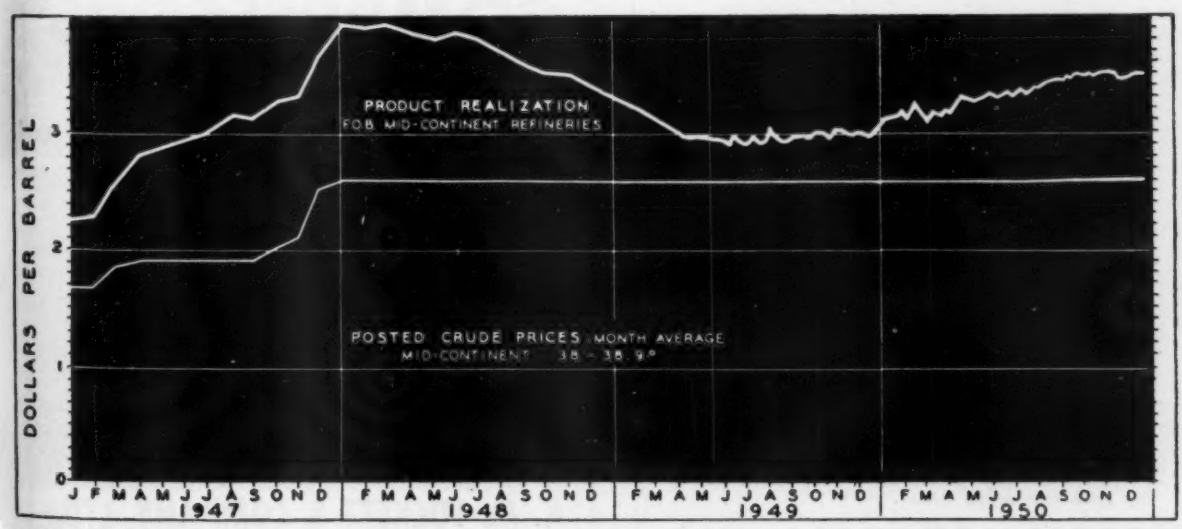
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	6.0


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
0
1
2
3
J F M A M J J A S O N D
1947
F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.50 for week ended December 23, $3.51 for previous week, and $3.08 for December 1949.

CONTROL SCALE and CORROSION

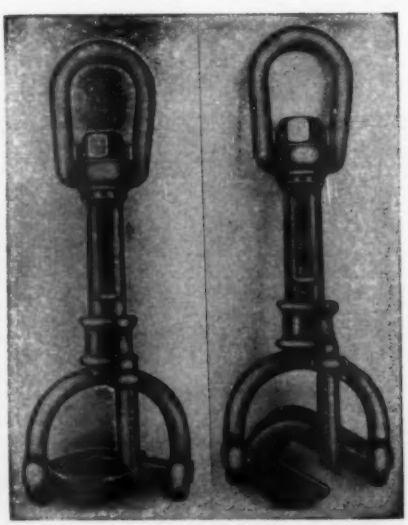
IN ENGINE JACKETS,
COMPRESSORS, COOLING TOWERS — Wherever Water Is Used

• • • Increase efficiency of equipment by maintaining scale-and-corrosion-free water side surfaces • • • Prevent expensive shut-downs and replacements.

Wright CHEMICALS

WRIGHT CHEMICAL CORPORATION
Specializing in Water Conditioning
GENERAL OFFICE AND LABORATORY—615 W. Lake Street, Chicago 6, Ill.
OFFICES IN PRINCIPAL CITIES
Sole Distributor of Nelson Chemical Proportioning Pumps

NORRIS BROTHERS IMPROVED SAFETY SUCKER ROD ELEVATOR



Handiest and safest elevator on the market. Forged steel body and high carbon alloy steel forged jaw. Buy from your supply dealer.

NORRIS BROTHERS, INC.
ROBINSON, ILL.

AIR for the Oil Industry

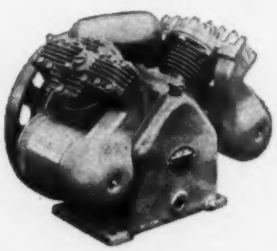
WORTHINGTON AIR-COOLED

Angle, Single and Two-Stage

COMPRESSORS

1 HP to 15 HP

Available as Bare Units with V-Drive Sheaves; or Tank-Mounted as well as Base-Mounted. Electric or gasoline engine drive.



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FIELD STOCKS AT CONVENIENT POINTS

★

A. M. LOCKETT & COMPANY, LTD.
HOUSTON NEW ORLEANS DALLAS

EQUIPMENT MEN . . . in the News

Tube Turns Names Two New Distributors

John G. Seiler, executive vice president and general sales manager of Tube Turns, Inc., has announced the appointment of Bethlehem Supply Co., and Bethlehem Supply Co. of California as distributors of Tube-Turns welding fittings and flanges.

Bethlehem Supply Co. is a subsidiary of Bethlehem Steel Co., and has its main offices in Tulsa. Its oil-country stores and service organization cover Arkansas, Colorado, Illinois, Kansas, Louisiana, Mississippi, New Mexico, Oklahoma, Texas, and Wyoming. G. A. Tompson is president and C. R. Zimmerman is executive vice president.

Bethlehem Supply Co. of California is a subsidiary of the Bethlehem Pacific Coast Steel Corp. Its main offices are in Los Angeles and its oil-country stores and service organization are located in 11 strategic areas in California. Wendell M. Jones is vice president and general manager and J. W. Hollingsworth is general manager of sales.

FWD Names Hanson Market, Production Research Head

The Four Wheel Drive Auto Co. has announced the appointment of William Hanson as manager of a newly created market development and research department. Hanson has devoted 12 years to the development and sale of metal and fabric products. For another 12 years, prior to 1936, he was advertising manager for FWD.

The newly created department has been organized to secure contracts for the manufacture of component parts and assemblies for noncompetitive companies, using excess machine and fabricating capacity in the FWD factory. Hanson will also seek out new products that can be manufacturede and merchandised by FWD.

Yetter Made Senior Vice President of C. H. Wheeler

The appointment of F. L. Yetter as senior vice president of C. H. Wheeler Manufacturing Co. has been announced. Yetter rejoined the company after a 20-month period during which he served as director of foreign affairs for Kuljian Corp. He has long been associated with the power-plant field, having started with DeLaval Pump Co. in 1913, changing to Alberger Pump & Condenser Co. in 1915, and beginning his long tenure of service with Wheeler in 1916.

F. L. YETTER

Yetter advanced from pump designer through increasingly responsible positions to chief engineer, and assistant general manager of C. H. Wheeler. In 1942 he was named acting general manager. In 1946 he was elected vice president and assistant general manager, from which post he resigned in April 1949.

C. H. Wheeler Manufacturing Co. now joins Economy Pumps, Inc., Klipfel Manufacturing Co., Liberty Planers, Inc., and Smith & Mills Co. as a division of Hamilton-Thomas Corp.

Link-Belt Opens New Pittsburgh Factory Branch Store

For better service to industries in the greater Pittsburgh area, Link-Belt Co. has constructed and is now operating this new factory branch store at Pittsburgh. This new building provides ample space for stocking popular Link-Belt power-transmission and materials-handling products and serves as headquarters for the increased Pittsburgh personnel.

Allegheny Ludlum Announces Election of New Officers

Election of Edward J. Hanley as president and Clark W. King as executive vice president of Allegheny Ludlum Steel Corp. has been announced by H. G. Batcheller, chairman of the board. Hanley, presently serving as executive vice president, will succeed E. B. Cleborne, who announced his resignation. King, who is now vice president and treasurer, succeeds Hanley and will retain the position of treasurer. Cleborne will continue to serve the company as a director and vice president.

The retirement of Frank B. Lounsberry as vice president and technical director and the appointment of W. B. Pierce, presently manager of the company's sales development and engineering service department, as technical director were announced at the same time.

Honeywell Expands Output Facilities of Brown Division

Minneapolis-Honeywell Regulator Co. is expanding its industrial production and operating facilities in Philadelphia, according to Henry F. Dever, president of the company's Brown Instruments Division.

The new expansion is made possible, Dever said, by the purchase of the Thomas M. Royal plant. The company has also acquired about 60,000 sq. ft. of undeveloped property in addition and adjacent to its new site, Dever added.

Honeywell's Brown Instruments Division employment is nearing the 2,000 mark, about 300 persons or 20 per cent more than during the World War II peak.

The building just acquired in Philadelphia is a three-story reinforced concrete structure. It was partially occupied by Honeywell on December 15. Complete possession will take place next month following modernization to meet special requirements.

Vaughn Named Manager of G. E. Instrument Division

Henry A. Vaughn has been appointed manager of manufacturing of the General Electric Co.'s meter and instrument divisions at Lynn, Mass., according to an announcement by Harold E. Strang, manager of the divisions.

Vaughn, formerly superintendent of the specialty and standard instrument manufacturing divisions, succeeds

Herbert L. Ross, who recently was named manager of the G-E River Works at Lynn, Mass.

A graduate of University of North Carolina with a degree in electrical engineering, Vaughn joined G. E. in 1922.

Tracerlab Buys Building Site for Expansion

Tracerlab, Inc., has contracted to purchase a building site of approximately 17 acres in West Concord, Mass. The company intends to construct a new building to house its engineering and manufacturing operations as well as certain phases of its radiochemical programs, according to an announcement by William E. Barbour, Jr., president.

It is contemplated that the first unit will handle additional instrument production and radiochemical laboratories in connection with the current expansion program.

Tracerlab was incorporated in 1946 to promote the use of radioactive materials in scientific research and industry. The company now has more than 350 employes, about half of whom are on professional level as physicists, chemists, and engineers.

Radiochemical laboratories and manufacturing facilities are maintained in Berkeley, Calif., and through an affiliate, Saphymo, in Paris, in addition to the principal operation in Boston.

Moore Products Opens Pittsburgh Branch Office

Moore Products Co., Philadelphia, has announced the opening of a Pittsburgh branch office. R. H. Owens, formerly sales engineer for the company in northern New Jersey, is branch office manager.

In addition Moore Instrument Co., Ltd., Toronto, has been formed to supply Canadian industries with Moore Nulimatic instruments and Moore pneumatic comparator gages. K. G. Mitchell, active for many years in the Canadian industrial instrument field, is manager of this new company.

Rives, Dyke Moves to Larger Offices

Rives, Dyke & Co., advertising agency, has recently completed a move to larger and more modern offices at 1611 Sunset Boulevard, Houston. Every facility required in modern advertising technique, both for industrial and consumer goods, is available to the company in its new offices, it was stated. Provision has been made for enlarging present space whenever future expansion is necessary.

Rives, Dyke & Co. specializes in industrial advertising for service and equipment companies and other general industrial manufacturers.

Houston Nomads Induct Three New Members

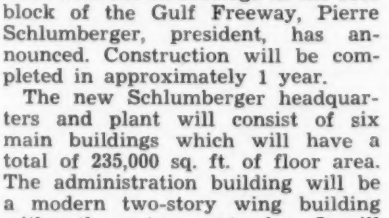
A part of the program of the December meeting of the Houston Nomads was devoted to the induction of three new members. Houston Nomads president, E. L. Lorehn, is shown with new members William A. Griffin, Jr., Daniel Orifice Fitting Co.; J. D. Rice, W-K-M Co.; and Charles Gearke, Baash-Ross Tool Co.; and deputy sergeant-at-arms C. F. (Bud) Vincent, Byron Jackson Co.

Schlumberger Begins Work On New Office and Plant

Schlumberger Well Surveying Corp., Houston, has begun construction of a new $3,000,000 home office and plant to be located on a 36-acre tract with 900-ft. frontage in the 6000 block of the Gulf Freeway, Pierre Schlumberger, president, has announced. Construction will be completed in approximately 1 year.

The new Schlumberger headquarters and plant will consist of six main buildings which will have a total of 235,000 sq. ft. of floor area. The administration building will be a modern two-story wing building with a three-story center bay. It will face 500 ft. along the Gulf Freeway and will have approximately 50,000 sq. ft. of floor space. Other buildings will be the engineering building, warehouse, truck shop, instrument production shop, and the engineering testing-power plant building.

An 800-ft.-deep test well will be drilled just outside the testing laboratory. The well will be cased with a nonconductive porous material so that oil-field electrical-logging conditions can be simulated for testing of equipment. A second shallow test well will be drilled in which pressure can be built up to 12,000 psi. and temperatures increased to above 300° F. This well will be capable of reproducing conditions in the deepest wells now being drilled. It also will be a part of the testing laboratory.



An architect's model of Schlumberger's new home office and plant.

There are now nearly 500 employes in the Houston office and plant and the new buildings will be designed to give better working conditions with closer control among departments.

Schlumberger Well Surveying Corp. furnishes the industry with a number of different types of specialized services for both drilling and producing wells.

Speaker Tells of Corrosion Causes

Hydrogen sulfide, sulfur dioxide, and escaping steam are some of the persistent causes of corrosion in petroleum refineries, Sterling L. Ross, protective-coatings engineer for Pure Oil Co. advised the licensees of Insul-Mastic Corp. of America. Ross spoke on the use of protective coatings in the petroleum industry.

The occasion was the first annual sales forum of Insul-Mastic Corp. November 27 to 29. Elmer R. Queer, professor of engineering research at Pennsylvania State College and chairman of the thermal insulation committee of the American Society for Testing Materials spoke on moisture-vapor transmission and the methods of checking by vapor sealing.

Final speaker of the sales forum was Raymond Thomas, insulation specification engineer of Union Carbide & Carbon Corp., and past chairman of the thermal insulation committee of A.S.T.M. Thomas also spoke about vapor sealing as applied to thermal insulation in industry.

Edward F. Doty Joins Warren Steam Pump Co.

Edward F. Doty, designer of screw and rotary pumps, has recently become associated with Warren Steam Pump Co., Inc., Warren, Mass. Doty was formerly with Quimby Pump Co., specializing in design and application engineering. He was the originator and developer of the modern method of computing screw capacities, friction and slippage losses in screw and rotex pumps.

Doty is the designer of numerous pumps for the process industries, building construction, and various other usages.

Warren Steam Pump Co., Inc., purchased Quimby Pump Division of H. K. Porter Co., Inc., in August of last year and all manufacturing has been removed to the Warren plant.

Watts Named as Ass't Head Of Wickwire Spencer Sales

L. A. WATTS

L. A. Watts' appointment as assistant general sales manager of the Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corp., has been announced by H. C. Allington, general manager of sales at the executive offices of the corporation in New York City.

Watts is a graduate of Northwestern University in 1938. He joined the then Wickwire Spencer Steel Co., as a chemist in the Buffalo plant.

In 1947, he was appointed manager of the General Wire sales department. In addition to this duty, in 1949, he was selected to head the newly opened Detroit district sales office as manager. He relinquished this managership in August 1950.

Lake Charles Made Oilwell District Headquarters

Establishment of headquarters of Oil Well Supply Co.'s Southeast Texas district at Lake Charles, La., has been announced by F. D. Smith, Gulf Coast division manager for this U. S. Steel subsidiary. The district headquarters formerly were located at Houston.

At the same time Smith announced the appointment of A. D. Butler as manager of the Southeast Texas district. Butler succeeds F. W. Little, who has been transferred to Oilwell's Central Midwest division with headquarters at Dallas as assistant to V. J. Waters, division manager.

Butler has served as district manager of the Southwest Texas district since September 1949, with headquarters at San Antonio. He joined Oilwell in 1935 and held various positions in West Texas, Pennsylvania, Kentucky, and Illinois.

Little is a veteran of 22 years' service with Oilwell, starting in 1929 in the accounting department at Pittsburgh. He later served as manager of the Jennings, La., store, and in 1941 he moved to Dallas as assistant to sales manager, Central Midwest division. In February 1944 he transferred to Pittsburgh as assistant manager of the tubular department, and in February 1946 he became district manager of the Southeast Texas district at Houston.

Thew Shovel Names Leland Equipment as Distributor

Thew Shovel Co., Lorain, Ohio, has announced the appointment of Leland Equipment Co. as its distributors in all of Oklahoma except for Ottawa County. Leland will handle all sales, service, and parts for the Thew line of Lorain power shovels and cranes. Lorain products will be available through the main Leland office in Tulsa and the branch in Oklahoma City. A Longview, Tex., branch is maintained for the exclusive distribution of the Leland truck and trailer bodies and a complete line of truck equipment; therefore, it will not carry the Lorain line.

Whiton Names Price as Turbine Sales Manager

Whiton Machine Co., New London, Conn., has announced the appointment or Evan Price as turbine sales manager. Formerly in charge of turbine sales for Kissick Co. of New York, Price has an extensive technical and practical background of turbine sales experience in the power plant and oil-refinery fields. Price will make his headquarters in the New London offices of Whiton Machine.

Henke Superintendent of East St. Louis Plant

H. J. Henke has been named superintendent of the East St. Louis, Ill., Bitumastic protective coatings plant of Koppers Co., Inc., R. C. Stormquist, production manager of the company's Tar Products Division has announced.

Henke formerly was superintendent of the Verona, Pa., plant of the Tar Products Division. Henke attended Lehigh University before joining Allis-Chalmers Manufacturing Co. as a test engineer in 1927. In 1929 he became associated with Koppers procurement department. From 1933 to 1936 he was engaged in time-study work for Remington Rand, Inc., before returning to Koppers. He was named superintendent of the Verona plant in 1944.

De Graffenreid Made District Sales Engineer at Tulsa

DE GRAFFENREID

Dean De Graffenreid has been appointed district sales engineer for the Tulsa office of Byron Jackson Co., according to Lynn Sawyer, general manager of pump division and vice president of the company.

De Graffenreid joined Byron Jackson Co. in 1947, as test engineer for the pump division. In March 1948 he transferred to the sales department of the pump division and was assigned to the Los Angeles branch office, his work being primarily in the oil industry of southern California. In May of this year he was assigned to the division office in Tulsa.

R-S Products Purchased By S. Morgan Smith Co.

Purchase of the R-S Products Corp., of Philadelphia, by S. Morgan Smith Co., of York, Pa., hydraulic turbine and valve manufacturers, effective December 1, has been announced by Beauchamp E. Smith, president.

Smith announced that the present management of R-S Products, W. E. Borbonus, president, and D. W. Hopkins, executive vice president, will be retained along with the present five-man board of directors. S. Morgan Smith Co. will provide two additional members of the R-S board, Burwell B. Smith, vice president, and Duncan D. McArthur, secretary, of the parent company. There will be no change in the operation of the Philadelphia concern.

R-S manufactures butterfly valves which are widely used for controlling the flow of fluids in process industries as well as in power plants and water-supply systems. The combined operations of the two companies will permit sales of valves of all sizes. R-S also manufactures large industrial heat-treating furnaces.

Johnson Corp. Appoints Thermal Industrial Engineering

The Johnson Corp. of Three Rivers, Mich., manufacturers of steam specialties and boiler-room equipment, has announced the appointment of Thermal Industrial Engineering Co. of Denver, Colo., as new district representatives.

Thermal Industrial Engineering Co., with Frank T. Settle president, will represent Johnson in Colorado and Montana, eastern Wyoming, western Nebraska, western Kansas, and northern New Mexico.

CLASSIFIED ADVERTISING

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

UNDISPLAYED CLASSIFIED 12c a word one issue. 10% Discount three or more issues. $3.00 minimum charge. Blind Box in our care counts nine words. Payable in Advance.

EQUIPMENT FOR SALE

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES, E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.

WELL equipment. New and used spudders, rotaries, core drills, all sizes and types. Cable tools, drill pipe, bits, pipe. Fishing tools rented. Everything for well service. Pressey & Son, Pueblo, Colo.

FOR SALE: 1946 Cardwell QST Servicing unit with 49′ 7″x8″ Cardwell Mast. Suitable for 3500′ 2½″ tubing. Complete set tubing and rod tools. Mounted on 3-Ton EH Mack truck. Frank Jones, McPherson, Kansas.

FOR SALE: Westcott, Foxboro and Emco Gas Meters, Geo. R. Milner. Box 124, Okmulgee, Oklahoma.

SUPERIOR COMPRESSORS
2—90 HP Direct Driven, Located Oklahoma City, extra cylinders available. Alfred B. Kern, 223 Wright Bldg., Tulsa, Oklahoma.

Several Army Surplus 4½″ x 6″ Gaso Duplex 1860 Pumps — two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN.: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

CAN FILLING MACHINE!

FOR IMMEDIATE DELIVERY AT A DECIDED BARGAIN

5-quart can filling machine manufactured by Sprague Sills—Series 33-94.

5-quart can boxer and elevator complete with motor.

Stenciler, gluer and compression unit manufactured by Boxer Nuway Canning Machine Company.

EXCELLENT CONDITION!

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LIPSETT INCORPORATED

P. O. Box 2452, Phone 5-9419
Tulsa, Oklahoma

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO
Box 167, Red Fork Station, Tulsa, Oklahoma

DRILLING rig located at Greggton, Texas, yard, and consisting of complete steam rotary drilling rig without drill pipe, including 2 120 H.P. oil well boilers, 1 6″ Union Tool unitized draw works, 1 12x12 Ajax roller bearing steam engine, 1 14½x7½x18 Ideal mud pump, Ideal rotary table, swivel, crown block, traveling block, etc. Contact Rudco Oil & Gas Company, Box 2018, Tyler, Texas.

FOR SALE

9—230 H.P. Bessemer Type 10 Engines with compressors, Steel Buildings, Valves, and Fittings complete for installation. Located Salem, Illinois Oilfield.

ENGLE PETROLEUM, INCORPORATED
Box 655, Evansville, Indiana
Telephone 5-5179

CASING—5½″ and 7″ No. 1 grade, lapweld and seamless.
TUBING—2″, 2½″, and 3″ regular and upset.
WATER WELL CASING—5⅝″ and 6¼″ Attractively priced.

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9th & B&O, Braddock, Pa.

EQUIPMENT FOR SALE

FOR SALE: Pulling 100 wells in Ohio. Approximately 100,000′ 2″ 4.7# Tubing, 200,000′ 2″ 3.75# Line Pipe, 50,000′ 4⅞″ Casing, 70,000′ 6¼″ Casing, 5,000′ 8¼″ 24# Casing, 3,000′ 10″ 32# Casing. All Lapweld. Also 2,200′ 16″ OD x ⅜″ wall P.E. Used Line Pipe. Send us your inquiries. Buckeye Supply Co., Zanesville, Ohio.

COLLARS—COLLARS—COLLARS
Large quantity 7″ 10 V thread collars. Call Edco Pipe & Supply Co., 933 or 357, Drumright, Oklahoma.

NEW PIPE FOR SALE
DELIVERIES FIRST QUARTER 1951

5250 tons, J-55, 5½″ O.D., 15.5#, or 17.0#, Smls. casing. 2750 tons, J-55, 7″ O.D., 23.0#, or 26.0#, Smls. casing. 500 tons each of 2⅜″, 2⅞″, 3½″, 4½″, 5⅛″, and 6⅝″, A.P.I. drill pipe, Int. up-set, grade D. Additional sizes available. Made in Europe. Inspection and war risk insurance available. Subject to prior sales.

FRED D. ULLMAN, IMPORTERS
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2—3′6″ x 10′ x ⅛″ vertical
1—3′6″ x 16′ x ⅜″ vertical
1—20″ x 5′ x ⅜″ vertical
2—3′ x 6′ x ⅜″ vertical on 6″ skirt
1—12′ x 66′ x ¾″ w/29 pressed steel trays and reboiler
1—3′ x 7′ x ¼″ horizontal
1—6′ x 38′ x ⅞″ vertical
1—3′ x 5′ x ⅛″ vertical
1—3′6″ x 16′ x ⅛″ horizontal
4—3′ x 12′ x ⅜″ vertical
1—3′6″ x 30′ x 1″ w/6 sidepans—vertical
1—3′6″ x 5′ x ¼″ vertical
1—3′6″ x 15′ x ⅛″ horizontal
1—15½″ x 5′ x ½″ vertical
1—4′ x 26′ x ⅛″ vertical
2—2′6″ x 15′ x ⅜″ vertical
1—4′ x 16′ x ½″ horizontal
6—2′6″ x 20′2″ x ⅜″ vertical

WRITE—WIRE—PHONE

DULIEN STEEL PRODUCTS, INC.
of Washington
P. O. BOX 667
COTTON VALLEY, LA.
PHONE: COTTON VALLEY 26

EQUIPMENT FOR SALE

3—160 CUBIC FOOT Air Compressors. Diesel: Gasoline. J. C. Morrison, Midwestern Drillers, Liberal, Kansas. Phone 2441.

COUPLINGS—6" Merchant, straight tapped, 4½" long, 8 V thd. New, perfect—300 pcs. Julius M. Fogelman, 1649 Perkiomen Ave., Reading, Penna.

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In Stock for Immediate Delivery
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MYERS-BAGWELL COMPANY
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STEAM and POWER RIGS
Complete in Excellent Condition
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2 NEW SHOT HOLE DRILL RIGS

SPECIAL PRICE $5000

Complete with mast, double acting hydraulic rams to provide 10′ continuous non-chucking stroke, hydraulic operated winch, hydraulic powered rotary table, swivel and 4x5 mud pump, all mounted on 1½ ton Ford truck. Capacity 400′ of 3" hole, or equivalent. Also available are 49 sections of Drill Pipe, 2⅜" x 10′.

International Derrick & Equipment Co.

Department No. 204, Atlantic Building
DALLAS, TEXAS

EQUIPMENT FOR SALE

FOR SALE—One truck mounted Sullivan 200 Rotary Drilling Rig complete including 2,000 feet of new 2 and ⅞" drill pipe, drill collars, light plants, water pumps, dog house; three other trucks, one new 5 x 10 mud pump and motor operating as a separate unit. Box D-828, The Oil and Gas Journal, Tulsa, Oklahoma.

ONE Gardner-Denver Compressor Unit size 12 x 11 and 4¾ x 11, direct connected with 100 HP electric RPM motor, complete with all equipment; located at Refugio, Texas; in service forty-five days. Will take reasonable discount. Clymore Petroleum Corporation, 238 Kaffie Building, Corpus Christi, Texas.

FOR SALE: 29,300 FT OF 4" OD INVASION PIPE ELECTRIC WELD, BEVELLED FOR WELDING, NEW PRIME QUALITY. HERMAN KAISER PIPE & SUPPLY CO., 819-20 PALACE BLDG., TULSA, OKLAHOMA. PHONE 3-3413 AND 4-6358. AFTER 5 O'CLOCK RES. 5-8633.

BARGAIN SALE: 1 FRED COOPER SINGLE DRUM PULLING UNIT WITH TRACTOR AND 1 FRED COOPER, DOUBLE DRUM PULLING UNIT WITH TRACTOR. HERMAN KAISER PIPE & SUPPLY CO., 819-20 PALACE BLDG., TULSA, OKLAHOMA. PHONE 3-3413 AND 4-6358. AFTER 5 O'CLOCK RES. 5-8633.

1—4′-0" ID x 40′-6" x 1¼" thick Tower. No trays. Tri-State Supply Company, Box 610, Mt. Pleasant, Texas.

PORTABLE ROTARY RIG: Mayhew-Douglas truck mounted portable rotary drilling rig, entirely complete with 3000 ft. drill pipe, 16 drill collars, heavy 4 wheel drive tractor truck and water-pipe trailer, bus type tool house with shop, parts bins and bunk, oil field gin pole truck, butane trailer, all tools and supplies. Outstanding performance record. Suitable for drilling slim holes to 2000′ for 5½" casing or drilling 5⅝" strat and core holes to 3000′. Complete specifications and pictures on request. Douglas Engineering Company, 3607 Princeton Ave., Dallas, Texas. Phone LOgan-2220.

EQUIPMENT WANTED

PULLING UNIT

Wanted—Truck mounted unit complete with mast. Unit must be capable of handling 5000′ of 2½" tubing and have drum that will spool 7,500′ of ⅞ line.

Box D-822, The Oil and Gas Journal, Tulsa, Oklahoma

HELP WANTED

REPUTABLE Wichita, Kans, Corporation entering oil business, plans to spend considerable amount money for development and exploration. Want Geologists who can work up drilling deals, get farmouts. Managerial ability, etc. Must be experienced Western Kansas geology. Good salary, interest in deals. Replies confidential. Box D-809, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICAL ENGINEER: New large oil pipeline company requires electrical engineer to handle design, construction and devise maintenance procedures, all classes equipment to 5-KV switch gear. Some familiarity with sub-stations to 110-KV, 5000-KVA desirable but not required. No communications or electronics involved. Include full professional and personal details and minimum salary, first letter. Job is permanent. Box D-761, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, EXECUTIVES, TECHNICAL MEN, SALARIED POSITIONS—$3600 TO $30,000. THIS CONFIDENTIAL SERVICE FOR OUTSTANDING MEN WHO DESIRE A CHANGE OF CONNECTION, WILL DEVELOP AND CONDUCT PRELIMINARY NEGOTIATIONS WITHOUT RISK TO PRESENT POSITION. SEND NAME AND ADDRESS FOR DETAILS. TOMSETT ASSOCIATES, 1204 BERGER BLDG., PITTSBURGH 19, PA.

EXPANDING program of well known geophysical company provides excellent opportunity for a few qualified Party Chiefs. Applicants should have not less than three years experience as Party Chief, be proficient in interpretive skill and have proven ability to administer crew. Liberal compensation based upon competence of applicant. Box D-813, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEERS
OPERATIONS SUPERVISORS
PERFORATOR OPERATORS
Only Experienced Men Need Apply
WRITE ONLY
WELEX JET SERVICES, INC.
3909 Hemphill Street, Fort Worth 9, Tex.

HELP WANTED
CHIEF GEOLOGIST

Good opportunity for geologist with sufficient education, training and experience to act as Chief Geologist for strong independent oil company. Location, Houston. Write giving complete details of personal and employment history. Replies confidential. Address—

Box D-824, The Oil and Gas Journal, Tulsa, Oklahoma

AUSTRALIA
GAS AND FUEL CORPORATION OF VICTORIA

Applications returnable to the Secretary, Premier's Department, Melbourne, C.2, by 31st March, 1951, are invited for appointment to the Office of Chairman of Directors of the Gas and Fuel Corporation of Victoria, under the Gas and Fuel Corporation Act 1950.

The Corporation is empowered to carry on the businesses of production, sale and supply of Town Gas, the gasification of brown coal by the Lurgi high pressure gasification process, the recovery, manufacture and sale of coke, tar, pitch, ammonia, dyes and other residual and synthetic products, also by-products and residuals arising in the manufacture of Town Gas.

The salary is £5,000 per annum. Full details of the functions and scope of the Corporation are contained in the Victorian Gas and Fuel Corporation Act 1950, copy of which is available for perusal at the Office of the Australian Consulate General, New York.

EQUIPMENT FOR SALE

LINE PIPE FOR SALE

30,000′ 2⅜" OD 3.75# & 4# Good Used Lapweld T&C Range 1 Line Pipe.

50,000′ 6⅝" OD 18.97# Excellent Grade Used Lapweld, Cleaned, Beveled Ends, 20′ RML.

1,100′ 6⅝" OD 18.97# Strictly No. 1 Electric Weld, 45′ Lengths, Plain Ends.

20,000′ 8⅝" OD x .322" Wall 28.55# Used No. 1 Grade Lapweld, 30′ to 40′ Lengths, Beveled Ends, FOB Texas Point.

CASING & TUBING

25,000′ 2⅜" OD 4# Good Used Lapweld Range 1 Tubing with New 11½ V-Threads and Collars.

5,000′ 5½" OD 10# Reconditioned Seamless Casing, New 11½ V-Threads and New 5½" Collars (Recommended for Shallow Wells).

10,000′ 7" OD 20# Good Used Lapweld Range 1 T&C Casing, 10 V-Threads.

5,000′ 8⅝" OD 25# Good Reconditioned Casing, T&C, 8 V-Thds., Range 1.

2,000′ 10¾" OD 35.75# Good Used Lapweld T&C Casing, Range 1, 8 Thread.

OTHER SIZES OF LINE PIPE, SEAMLESS TUBING IN SUITABLE SUBSTITUTE SIZES FOR STANDARD PIPE (EXCELLENT FOR GAS, GATHERING AND FLOW LINES), CASING AND TUBING AVAILABLE FOR IMMEDIATE DELIVERY.

FOR FURTHER INFORMATION, WIRE OR PHONE AT ONCE

A. J. STRUBEL, Broker

SIDney 1791 (Day Phone) HUDson 8152 (Night Phone) . . . 4946 Murdoch, St. Louis, Mo.

HELP WANTED

POSITION Available February 1, 1951, Assistant or Associate Professor with Masters degree or higher in Petroleum Engineering to teach reservoir engineering courses in rapidly growing school with excellent laboratory and other facilities. Qualifications will determine salary, but will be comparable to industry. Location Southwest. Box D-765, The Oil and Gas Journal, Tulsa, Oklahoma.

ANALYTICAL Chemist with 3-5 years' experience in light hydrocarbon and petroleum chemicals analyses to head plant control laboratory in the Ohio River Valley area. Box D-810, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED ACID SERVICE MAN. Man wanted to run two unit acid service station on salary and commission. Must be good salesman. Box 11054, Fort Worth, Texas.

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla.

REFINERY ENGINEER: Minimum 3 to 5 years experience in refinery maintenance, construction and operation to act as assistant superintendent of substantial Midwestern Independent Refining Company. Write Box D-818, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER for employment at Tuscaloosa, Alabama, in asphalt refinery in topping, vacuum distillation and oxidizing. Prefer man with degree in Mechanical Engineering. Three or more years actual experience essential. Salary open. Write Hunt Oil Company, 700 Mercantile Bank Building, Dallas, Texas, giving full particulars of qualifications and experience and names of references.

GEOPHYSICIST WANTED

Position open for experienced seismologist for supervisory work with major independent, Midcontinent area. Permanently located in Tulsa. In replying, give personal history, education qualifications, and details of professional experience.

Box D-823, The Oil and Gas Journal, Tulsa, Oklahoma

MINING PROJECT ENGINEER

A large Chemical Corporation operating Phosphate Rock Mines in Florida wants young Project Engineer with initiative and ability to work toward position of Assistant Plant Engineer. Background and experience in mining and metallurgy necessary.

Salary commensurate with responsibility in an aggressive growing organization.

Box D-826, The Oil and Gas Journal, Tulsa, Oklahoma

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, 35, 8 yrs. exp. Texas Gulf Coast, subsurface, leasing, developing and making drilling deals. Wish to locate in Rocky Mt. Area with aggressive independent, moderate salary and interest. Box D-817, The Oil and Gas Journal, Tulsa, Oklahoma.

SENIOR PETROLEUM GEOLOGIST, LANDMAN, or DEVELOPMENT PROJECT MANAGER. Immediately available for position with small oil company, royalty company, competent oil operator or drilling contractor. 26 years of education, training, and successful professional experience thoroughly qualifies me for any of the following: 1. Chief Petroleum Geologist. 2. Subsurface Geologist, Stratigrapher, Sedimentationist, or Special Geological Problems. 3. Magnetometer or Gravity Geophysicist, and Seismograph Interpreter. 4. Chief Landman for leases, royalties, titles, rentals, easements, maps, etc., 5. Development Project Manager for any wildcat or production development program, 6. Statistician, Investigator, Cost Information, Public Relations, Labor Relations, 7. Salesman of oilfield machinery, rigs, pipe, supplies, equipment, services, etc., 8. Latin American Representative for any kind of company in the oil business. H. A. Fonville, Box 21, Holland, Texas.

GEOLOGIST: M. A., single, draft exempt; with one year's experience in surface and subsurface (Core-Drilling) geology. Interested in exploration—U. S. or foreign. Available Feb. 15. Box D-829, The Oil and Gas Journal, Tulsa, Oklahoma.

WATER TREATING Specialist—Graduate Mechanical Engineer, 10 years executive and technical experience. Married, Age 31, Box D-827, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION or drilling superintendent with 25 years experience with independent and Major companies desires position either domestic or foreign. 633 No. Jefferson, El Dorado, Arkansas.

ROYALTIES

SPOT CASH PAID FOR PRODUCING ROYALTY. SMALL TO LARGEST BLOCKS IN SETTLED OR OLD PRODUCTION ONLY. Oil Specialists since 1904. GERBER & CO., 120 WALL STREET, NEW YORK, N. Y.

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington New Mexico.

MONTANA ROYALTIES

Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225 Great Falls, Montana.

LEASE AND DRILLING BLOCKS

SECONDARY recovery lease in Nowata Co. 12 bbl. settled production on two wells. Unlimited possibilities. For sale by owners or sublet for secondary recovery. G. C. Lizar, Ph. 82J—Garber, or J. L. Fowler, Ph. 4308W—1022 W. James, Enid, Okla.

WOULD LIKE TO SELL 1/16 interest in Eastern Oklahoma block of over 500 acres. We have finished two wells that are on pump. There is over $5,000 equipment on lease. We have a good Burgess Sand that is making free oil! We will contract to drill and furnish all equipment and expenses either acidize or Hydro-Frac, put oil in tank—you have no more to pay for $2500. This is a proven lease, on the up and up, and will stand your inspection. For appointment and more details write Box D-825, The Oil and Gas Journal, Tulsa, Oklahoma.

HAVE 300 acres Ohio County, Ky., with well drilled to 600 ft. Will give one-half interest to investor for $3500 to complete. James P. Friel, 4 So. 15th St. Phila. 2, Pa.

FOR LEASE: Sections 74, 75, 76, 78, 104 Block B-2, H. & G. N. Ry. Co. Gray County, Texas. Proven production. Southeast of Pampa. For more information write: Box D-815, The Oil and Gas Journal, Tulsa, Oklahoma.

TRADE: Casing and tubing for ground floor interest in proven or semi-proven production. Principals only, send full details to Box D-800, The Oil and Gas Journal, Tulsa, Okla.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1906. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

FOR RENT

FOR RENT: Approximately 5,500 square feet second story office space. Will arrange to suit tenant. Write Sweetwater Reporter, Sweetwater, Texas.

HELP WANTED

REFINERY POSITIONS AVAILABLE

Integrated oil company has following positions open in its modernized refinery located in southwest:

NIGHT SUPERVISOR — CRACKING AND POLY PLANT: Responsible for direct supervision of catalytic cracking and poly plant operations, plus general supervision over all refinery workers during night shifts. Must have five to ten years' refinery experience and be thoroughly familiar with all phases of refinery operations.

INDUSTRIAL ENGINEER: Responsible for the investigation of work methods in the processing, maintenance and clerical functions for the purposes of reducing costs, improving quality, or raising yields. Must be graduate Industrial Engineer with three to five years' experience and be familiar with refinery operations.

PERSONNEL ASSISTANT: Responsible for aiding refinery manager on problems relating to industrial relations policies and procedures, interpretation of union contracts, and settlement of grievances. Also responsible for maintaining personnel records, classification and seniority records, and for preparing work schedules. Must have three to five years' personnel and industrial relations work with emphasis on handling grievances and working with union representatives.

In letter, give education, age, military status, experience, and salary expected.

Box D-806, The Oil and Gas Journal, Tulsa, Oklahoma.

New Oil Setup

Venezuela is expected to create new ministry soon

A NEW ministry of mines and petroleum is expected to be created by the Venezuelan Government shortly after the first of the year, according to reports from Caracas.

This will be accomplished by separating these activities from the present Ministry of Fomento, or development. Such a move has been considered by the government for more than a year.

Santiago E. Vera, former counsellor in the Venezuelan Embassy in Washington and more recently ambassador to Switzerland, is mentioned as the likely choice to head the new mines and petroleum ministry. The fomento ministry would be left under Pedro Emilio Herrera, civil engineer and low-cost-housing expert, who was appointed to this post late last month succeeding Manuel R. Egana.

Dominant industry. — Petroleum is considered to warrant a separate and independent status in the Venezuelan Cabinet in view of its position as the country's dominant industry. The industry itself regards the move favorably as one that will expedite and facilitate its dealings with the government.

Meanwhile, it was learned that the several companies which have been negotiating with the government since early this year on the price at which they buy back royalty oil, are now considering a reply to the proposals made by Walter Levy, oil economist, on behalf of the government.

The Levy report, submitted to the companies about 2 months ago called for a formula under which the price would vary between one figured on the basis of West Texas crude prices and another based on residual fuel oil in California. The companies involved, principally Creole Petroleum Corp., Shell, and Mene Grande Oil Co., are understood to have taken exception to some of the proposals, and further negotiations are in prospect before the issue is settled.

Iraq to Build Refinery

Plans for the construction of a refinery by the Iraq Government have been advanced with the agreement of the National Bank of Iraq to provide $5,600,000 of the estimated $14,000,000 total cost.

The refinery project has been under consideration for several years. Plans now call for its construction in Baghdad with capacity sufficient to meet most domestic needs of the country. Iraq is now supplied mainly from the Abadan and Khanaqin plants of Anglo-Iranian Oil Co., Ltd.

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CALENDAR OF EVENTS

The Calendar of Events will be found on page 11 of this issue, immediately following the feature "They Say."

Deep-Production Test Fails

The initial attempt of Empresa Petrolera Fiscal, the Peruvian Government oil organization, to find deeper production in the old Zorritos concession, is reported to have failed.

The well went to a total of about 6,800 ft. Dunlap & Graham, Long Beach, Calif., drilling contractors, drilled the test as the first in a 10-well program being carried out for the government company. The government-operated concession area extends from the north edge of International Petroleum Co., Ltd.'s producing area and has about 340 bbl. daily output from existing shallower wells. The small refinery located on the government operated concession is reported presently shut down due to the export of the government's oil to Argentina under recent trade agreements.

Sumatra Producing L.P.G.

Liquefied petroleum gas is now being commercially produced at the Sungei Gerong refinery of Standard-Vacuum Petroleum Mij. near Palembang in South Sumatra.

The company has placed in operation at the refinery necessary equipment for L.P.G. processing, storage, and cylinder filling. The product is being shipped to the Philippines, the chief market in the Far East at present. The company said the plan to produce and distribute L.P.G. grew out of a 3-year marketing experiment that started at Manila in 1947. A survey showed many gas-appliance owners needed a fuel source to replace the war-destroyed municipal manufactured-gas plants.

Petroleum School Set Up

The first petroleum school established in Indonesia has been opened at Prabumulih in South Sumatra with financial support provided by N. V. De Bataafsche Petroleum Mij. (Royal Dutch-Shell).

The school will train Indonesians to occupy responsible positions in the industry. A total of 24 students will be taken initially from various parts of the Indonesian Archipelago. This number will be increased to 50 in the near future.

The B.P.M. organization also plans to open a similar school at Pladju near the Sumatra producing fields of the company. This is expected to be opened within a year.

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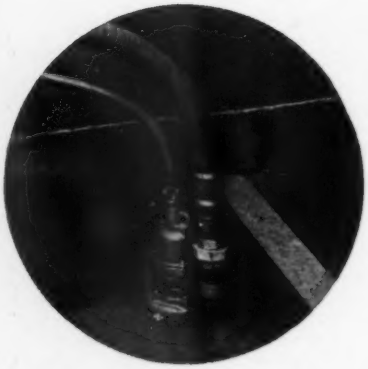
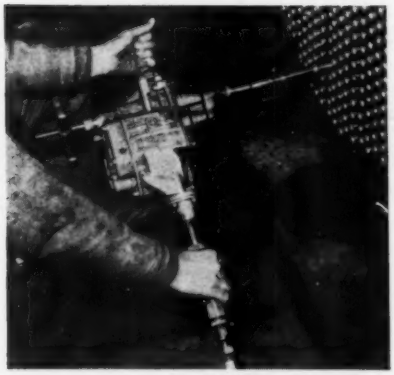
CP-365-RP Impact Wrench shortens down time on ammonia condenser maintenance.

cut down time

WITH CP AIR TOOLS



CP-20 Sump Pumps are noted for low air consumption and high lift.



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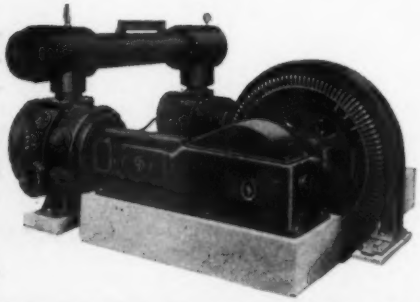

Class O-CE Two-Stage, Motor-Driven Compressor; capacities from 350 to 10,000 c.f.m.

For refinery maintenance Chicago Pneumatic offers an outstanding range of air-operated equipment. There's a complete line of powerful impact wrenches; grinders, scalers and wire brush machines; chipping hammers; heavy-duty tube rollers; pumps; and other essential tools.

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